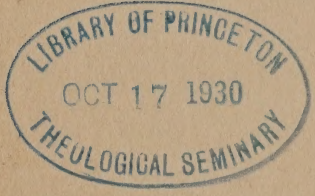

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THE PSYCHOLOGY OF ADOLESCENCE

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BY

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TO THE MEMORY
OF
MY FATHER
LEONIDAS CULVER BROOKS

EDITOR'S INTRODUCTION

THAT period of physical maturation known as adolescence has been regarded commonly as a time when youth breaks with his past and develops into a new person — when a "new self" is born. This belief has existed from the time of primitive peoples down to the present, and still finds expression in the more popular literature of the time. Those who believe that the birth of a new self is one of the chief characteristics of adolescence face the difficult task, however, of harmonizing such a popular conception with the facts brought forth within recent years as the result of careful scientific observation and measurement. These facts do not support such a theory.

Instead, we now know that the adolescent period, while marked by certain distinct and pronounced physical changes, from the mental and personal points of view is very largely only a maturing of individual traits and habits of thinking and acting that have been developing since childhood. Even in the matter of the emotional and volitional changes and the development of personality traits which take place with adolescence, there now seems to be little reason for believing that what a youth becomes is to any great degree independent of his own past environment and training. While these changes are marked and important, they are in the nature of a continuous development of what has gone before rather than an abrupt transition to some new and different type of living. While the self that emerges at the close of the adolescent period is vastly different from that which entered it, that self is still very similar in its fundamental traits and habits to the self that existed when the matura-

tion period began. In other words, any correct account of adolescent development must consider the physical, mental, moral, social, and religious development of the boy or girl from early childhood to manhood or womanhood as a continuous process. What takes place at adolescence is largely determined by what has taken place in the training of the youth before that period. The educational significance of this more scientific conception of the developmental process, for both parents and teachers, is most important.

The author of the present volume in this series has rendered an important service to teachers and parents, as well as to the student of the problems of adolescence, in assembling and organizing into usable form the results of the many hundreds of individual investigations which have been made as to different aspects of the problems of physical growth and the mental, moral, social, and religious development of young people during the adolescent and preadolescent years. In a series of chapters of much interest he has shown how careful observation, accurate measurement, and a critical interpretation of data replace superficial observations, inadequate measurements, and inferences based on recollections of individual cases, and from the assembled results he has drawn conclusions of importance as to the physical, mental, moral, social, and religious regimen to which youth must be subjected and which they must follow if the best results in the development of human personality are to be attained. The volume represents an important organization of objective evidence on a subject on which there has been much loose thinking, and is a useful contribution to our rapidly growing educational literature.

ELLWOOD P. CUBBERLEY

PREFACE

An important problem of psychology is that accurate description of human behavior which makes possible both its prediction with reasonable accuracy and its effective direction and control in the service of society and the individual. Accordingly, *The Psychology of Adolescence* has the task of describing adolescent nature, growth, and development so as to facilitate both reliable prediction and suitable guidance and control of behavior during the teens.

This book has developed in connection with courses offered by the author on the Psychology of Adolescence. Hundreds of college students, high-school teachers, and high-school principals in the author's classes at Johns Hopkins University and at the University of Wisconsin summer session have influenced it through discussion and conference and the approximately three thousand written questions which they have asked on problems of interest and practical value to them. The materials have been chosen to cover the topics which thus seem to be of greatest importance.

In the very nature of the case, we have drawn heavily upon general and educational psychology, thus indicating that many features of adolescence are not unique.

The general point of view, which we are forced by the facts to accept, is that development is a continuous function throughout childhood and into and through adolescence; that the youth normally does not break with his past; that, in fact, the roots of his present nature lie deeply imbedded in his past.

Many of the problems have been or are controversial. Accordingly, we have endeavored to present the evidence

on them impartially and at some length so that the reader may have a sound basis for his conclusions. Although the material is that which has proved most serviceable in the author's classes, and although an independent, critical evaluation of data bearing on the problems of adolescence necessitates some command of certain statistical and other technical procedures, yet the reader or instructor may, if he wishes, omit portions of chapters containing much statistical or technical detail. A glossary of technical terms and abbreviations is appended at the end of the volume immediately before the index.

The references at the end of the chapters have been selected to give an introduction to the extensive growing literature on the subject. A few for each chapter, marked by an asterisk (*), may be used as a first reading list to supplement the material of the chapters.

Many of the problems for discussion are those raised by students in the author's classes and by parents and teachers. Information on some of them is very meager or is lacking almost entirely, but we have included them anyhow in the hope that discussion by revealing this fact may lead to the further investigation necessary to solve them.

The author is under obligation to the many investigators upon whose researches he has so freely drawn. He also desires to express his thanks to the authors and publishers who have granted permission to use copyrighted materials. Specific acknowledgments are made in each case.

FOWLER D. BROOKS

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THE PSYCHOLOGY OF ADOLESCENCE

CHAPTER I

INTRODUCTION: THE MEANING AND SIGNIFICANCE OF ADOLESCENCE

1. *The meaning of adolescence*

ADOLESCENCE (from the Latin verb, *adolescere*, meaning to grow, to grow to maturity) refers to the period of growth extending approximately from ages twelve or thirteen to twenty. The period really closes with manhood and womanhood. During this time the reproductive functions mature, but it must not be supposed that adolescence is characterized by this fact alone. Various physical, mental, and moral changes are taking place at the same time, and their interrelations and coördinations are important for an adequate understanding of these years.

By puberty is meant the initial stage of adolescence, the earliest age at which the individual is capable of begetting or bearing offspring. Puberty among girls begins, on the average, about the thirteenth year, and, among boys, about the fourteenth year; but the time varies, as we shall see in Chapter III.

2. *The importance attached to adolescence*

People have always had some understanding of the importance of adolescence, and some appreciation of its significance. Among primitive and savage peoples puberty

rites were almost universal. The males of a tribe really consisted of four groups — the boys who had not arrived at puberty, and lived with the women and girls; the unmarried youths; the mature men on whom rested the duties and responsibilities of tribesmen; and the old men — the wise men — who directed the affairs of the tribe.

Puberty rites. Among some primitive peoples the boy, upon reaching puberty, was initiated into the tribal secrets, laws, customs, and rites, and at once or at a later time married and became a full tribesman. When the oldest son attained manhood, the father became one of the elders or "wise men," and retired from active service.

The initiatory rites usually were very impressive, and often lasted several months. A strong bond of brotherhood was formed and tribal unity furthered. Initiation frequently involved difficult ordeals or painful mutilations. Thus among certain Australians the novice lost one or more teeth, even though many blows were required to dislodge them. Severe beatings, confinement for weeks with little food and that the filthiest obtainable, marked initiatory rites among certain tribes of North American Indians,[1] among whom pubic rites for girls also were quite common and often severe and trying. The girl might be segregated in a small house for a month, six months, or longer, not being allowed to leave it except after dark and then with her mother. Among certain tribes of Brazil the girl at puberty was secluded indoors one month and fed bread and water; then she was brought forth and beaten by relations and friends until she fell senseless. Sometimes death resulted.

The method, however, was not always harsh. The moral training of the young adolescent in one tribe of New South Wales is described as follows:[2] "Each lad is attended by one

[1] See Lawson, *History of Carolina*, pp. 380–82.

[2] Palmer, *Journal of Anthropological Institute*, vol. 13, p. 296.

of the elders, who instructs him every evening in his duties, and gives him advice to regulate his conduct through life — advice given in so kindly, fatherly, and impressive a manner as often to soften the heart and draw tears from the youth."

Among the Romans the boy at fourteen put on the *toga virilis*. In the days of knighthood the boy was a page until the age of fourteen and associated with women, but at fourteen he became a squire and was in the company of men.

The initiatory rites constituted a large part of formal, primitive, adolescent education. By this means were taught such social virtues as (1) obedience to the tribal chiefs, (2) independence of maternal control, (3) bravery in battle, (4) observance of the customs and moral code of the tribe, and (5) liberality toward the community.

The adolescent in literature: the new self. Literature in all ages reflects the consciousness of adolescence as a distinct period of development. Thus it appears that the onset of adolescence has been regarded widely and from antiquity as a new stage in development.

Primitive peoples in the puberty rites emphasized the break between childhood and youth. After the rites the boy was a new person. This view has had wide acceptance. Many persons among civilized peoples to-day think adolescence marks a distinct break with the youth's past; that it means the birth of a new self. Many writers on adolescence stress this view. Close observation of children, however, gives little ground for the belief; careful, unbiased observation and investigation tend to clear it away entirely.

Two reasons account for the belief in abrupt changes at adolescence.

First: Uncritical observation. The changes preceding and accompanying adolescence are not observed carefully. Consequently, the differences between children and adults are not clearly perceived or appraised. The child of eleven

is little understood; he is thought of as a child; his true mental powers are underestimated in comparison with those of older children, so that the difference between eleven and fourteen really seems greater than it is.

Second: Some of the emotional disturbances at adolescence accentuate the new elements in the total physical-mental life of the teen-age period. As we see later, the youth's mental development and physical growth during adolescence are not the bizarre, saltatory affairs of popular psychology and the fiction writers. Changes do take place and they are of great importance, but life is a continuous function; the youth does not break with his past. Even in cases of great emotional upheaval, such as religious conversion, the individual's future is conditioned largely by the past. Of course, there is some truth in the lines,

> Every day is a fresh beginning,
> Every morn is the world made new,

but this is true of the individual as infant, child, adolescent, and adult; it is not a unique characteristic of this period.

3. *Adaptation, development, and integration*

Adaptation to environment a function of living organisms. A basic function of living organisms, possessed in varying degrees by both plants and animals, is adaptation to environment. Preparing individuals to meet adequately the circumstances of life has long been regarded as the important aim of education. We educate and train pupils so that they may adapt themselves more adequately to their surroundings, modifying conditions whenever it seems best to do so for individual and group welfare. This is the end. What about the means?

Adaptation through development and integration. Adaptation implies the suitable development and effective in-

tegration of the various physical, mental, and other functions. Without effective coördination of powers adequate adjustment is impossible. It is possible for an individual's mental and physical capacities to be so poorly coördinated that he is very inefficient. For example, a young man having skill as a bookkeeper may be irresponsible, late, and untrustworthy. Another man may carry about with him such a complete assortment of worries, jealousies, and other childish emotional attitudes that he cannot center his attention and best effort upon the task which he otherwise could quite effectively perform. Many people have, as part of their total organization of mental, physical, and moral traits, some habits which interfere with their greatest efficiency. Shakespeare, expressing a fundamental truth, says, "Happy is the man whose habits are his friends."

Integration of functions. The integration of gross bodily powers, of mental and moral habits, occurs at all life stages. The infant, forced by his environment, makes various coördinations; and, as he grows older, we find that each year's new experiences and new situations bring about additional ones. Adolescence also brings new experiences; and new adjustments have to be made. Consequently, these years are important ones in the life of the individual, but the years preceding and following adolescence also are important. Little value accrues from selecting some one period for special treatment and regarding it as unique in character and importance, although adolescence does have its distinctive characteristics just as do the years before and after it.

Adolescent education then, like all other education, seeks to provide such challenging conditions as lead to that integration of functions which insures adequate adjustment to probable life situations. Integration always takes place in respect to something. It is highly desirable that significant features of life be the stimuli leading to the coördination of mental, physical, moral, and other powers.

4. *Where are the adolescents?*

Number of adolescents in the United States. In 1920, there were 13,500,000 persons in the United States between the ages of thirteen and nineteen years. Of this number more than 10,000,000 were from thirteen to seventeen years of age. Where were these young people? What were they doing to prepare themselves adequately to meet the problems of adult life? How many were attending school? How many were seriously handicapped by physical and mental defects in meeting the complex conditions of life? How many were delinquent, were thus early showing signs of marked social maladjustment? How many were employed in gainful occupations, and what are the effects of such employment upon their development? Answers to these questions are needed to indicate the full scope of the problems which adolescence presents to society for solution. Unfortunately, adequate and reliable information is not now available to answer fully all such questions.

School attendance. According to the United States Census 7,300,000 persons between the ages of thirteen and nineteen years were attending school in 1920, and 6,000,000 of them were not enrolled in any school. Table 1 shows the number of each age enrolled and not enrolled, together with the percentages such numbers are of the total of each age.

The attendance figures for ages thirteen and fourteen probably are too large, and the non-attendance figures too small, because these years are compulsory-attendance ages in the majority of States, and parents or guardians may have purposely given incorrect reports to census enumerators. Then, too, many children might be reported as attending some school, whereas such attendance was at the beginning of the term or at some time in the term but continued for just a few days. Statistics compiled by the

TABLE 1. NUMBER OF PERSONS IN THE UNITED STATES BETWEEN AGES THIRTEEN AND NINETEEN ENROLLED AND NOT ENROLLED IN SCHOOL IN 1920

(*Fourteenth Census of the United States*, vol. II, p. 1045.)

AGE	ATTENDING		NOT ATTENDING	
	Number	Per Cent	Number	Per Cent
13	1,877,429	92.5	152,223	7.5
14	1,766,784	86.3	282,474	13.7
15	1,357,345	72.9	504,582	27.1
16	1,001,701	50.8	970,151	49.2
17	642,360	34.6	1,214,171	65.4
18	413,619	21.7	1,492,459	78.3
19	252,680	13.8	1,578,334	86.2

schools themselves are more reliable, but are not available for all schools — public, private, and parochial; we have, in fact, no accurate reports showing the number of children of each age actually enrolled in and really attending public, private, and parochial schools. The enrollment data in Table 1 must be discounted further, in trying to appraise the number of children receiving training in schools, because they do not tell us, for example, how many actually attended school six months or more, or for any other stated period during the school year.

Taking the figures of Table 1 at their face value, however, we see that more and more adolescents leave school as they become older. This is what we would expect. By the age of sixteen one half of the youth are not enrolled in any school.

Approximately four per cent more of the children thirteen, fourteen, and fifteen years of age were attending school in 1920 than in 1910, whereas about the same proportions of sixteen- to nineteen-year-olds were attending both these years.

On the other hand, the number attending high school, and the percentages of total population and of teen-age popula-

tion who are attending high school, have steadily increased during the past thirty years. Thus there was enrolled in the secondary school:

In 1890, 1 student per 178 of total population;
In 1900, 1 student per 110 of total population;
In 1910, 1 student per 82 of total population;
In 1920, 1 student per 50 of total population;
In 1926, 1 student per 35 of total population.

Thorndike [1] estimates that one person in ten entering the teens was enrolled in high school in 1890, and that by 1918 the ratio had increased to one in three. Similar computations indicate that by 1924 approximately two out of five entering the teens were enrolled in some secondary school.

Fig. 1 shows the percentage of total enrollment in each year of high school from 1908 to 1924, and indicates that eliminations were not so great during the third and fourth years, in 1924, as at the earlier dates.

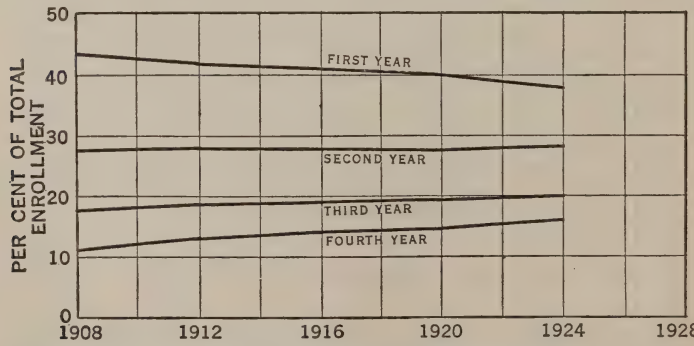

FIG. 1. PERCENTAGE OF TOTAL HIGH-SCHOOL ENROLLMENT IN EACH YEAR OF HIGH SCHOOL, 1908–1924

Retardation and acceleration. Not only do we want to know how many of these young people are in school, but we need to know whether the schools are adapting their cur-

[1] *School Review*, vol. 30, pp. 355–59.

ricula, methods of teaching, and control to those who are enrolled. Approximately one third of the adolescents attending school (2,500,000) are retarded. Table 2 is prepared from data on the age-grade location of more than 3,000,000 pupils in several hundred cities and towns of the United States.

TABLE 2. PERCENTAGE OF ADOLESCENTS WHOSE GRADE CLASSIFICATION IS NORMAL, RETARDED, AND ACCELERATED IN 830 CITIES OF THE UNITED STATES HAVING A POPULATION OF 25,000 OR MORE *

(Calculated from Table 14, Bulletin, 1924, no. 38, U.S. Bureau of Education.)

AGE	NORMAL	RETARDED				ACCELERATED		
		1 year	2 years	3 years or more	Total over-age	1 year	2 years or more	Total under-age
13...	53.4	18.4	10.1	6.2	34.7	10.5	1.4	11.9
14...	53.9	17.6	10.4	8.3	36.3	8.4	1.4	9.8
15...	54.6	17.3	9.6	9.1	36.0	8.0	1.4	9.4
16...	54.9	20.5	8.0	6.3	34.8	10.3	0.0	10.3
17...	65.9	20.2	9.9	4.0	34.1			
18...	53.5	26.8	12.6	7.1	46.5			
19...	0.0	60.3	24.2	15.5	100.0			

* Probably the figures for the entire United States would show more retardation than is shown in these cities.

Table 2 shows that slightly more than one half of the thirteen-year-olds enrolled in these cities, in 1919–20, were in the grades normal for their ages, whereas one third of them were retarded from one to five or more years, and about one eighth were accelerated one or more years. The figures are about the same for ages fourteen to seventeen.

The seriousness of such a great amount of retardation is seen also from the fact that approximately one million (one sixth) of the adolescents attending school, in 1920, were enrolled in the elementary school [1] — a school whose

[1] I have based this estimate upon the data of Bulletin, 1924, no. 38, U.S. Bureau of Education, which show that 17.3 per cent of the pupils between the ages of thirteen and nineteen, in 830 cities of 25,000 population and over,

organization, administration, curricula, and instruction are not primarily suited to adolescent needs.

Illiteracy.[1] Approximately 165,000 white adolescents (ages thirteen to nineteen) were illiterate in 1920 — that is, could not read and write English. Of this number, nearly four fifths were native born. Approximately 200,000 negro adolescents were illiterate. Little comment is needed on the inadequacy of this phase of the adolescent's training for effective participation in the social-economic life of the community. Twenty years earlier the *numbers* of illiterate white adolescents and of negro adolescents were both twice as great as in 1920, although the *percentage* of illiteracy was about three times as great in 1900 as in 1920.

Marital conditions.[2] In 1920 approximately 700,000 adolescents were reported as married; 600,000 of them were girls. More than 3000 married boys and nearly 6000 married girls had not reached the age of fifteen, while 1600 more boys and 13,000 more girls were fifteen years old. Four fifths of these married children who were under sixteen years of age were white adolescents, two thirds of them being native whites of native parentage. Certain studies[3] have shown the extent and seriousness of the problem of child marriage in the United States. The incompetency of fourteen- and fifteen-year-old boys and girls to perform effectively the multiform duties of head of the household is unquestioned. The social wastage from most of such early marriages is enormous. Both the number and proportion

were enrolled in grades one to six. My estimate is probably conservative, since the figures for the entire United States would doubtless show a larger percentage of the enrollment of these ages in the elementary grades.

[1] *Fourteenth Census of the United States*, vol. II, p. 1152 (estimated for ages thirteen and fourteen).

[2] *Fourteenth Census of the United States*, vol. II, pp. 388, 391, 392, 394, 395.

[3] See, for example, Richmond and Hall, *Child Marriages in the United States*.

of marriages of children under sixteen years of age have increased since 1900 and 1910.

Adolescents employed in gainful occupations. In 1920, more than 4,000,000 adolescents (ages fourteen to nineteen) in the United States were employed in gainful occupations, exclusive of laborers on home farms. Of this number, 125,000 were apprentices learning some trade or other occupation.[1] Of the adolescents gainfully employed, 400,000 (exclusive of home farm laborers) had not reached their sixteenth birthday. At each of the ages, fourteen, fifteen, sixteen, and seventeen, a smaller proportion of native

TABLE 3. NUMBER AND PERCENTAGE OF ADOLESCENTS EMPLOYED IN GAINFUL OCCUPATIONS

(*Fourteenth Census of the United States*, vol. IV, pp. 376 f. 476 f.)

AGE	ALL OCCUPATIONS		ALL OCCUPATIONS EXCLUSIVE OF HOME FARM LABORERS
	Number	Per Cent	
10–13	378,063	4.4	76,126
14	257,594	12.6	126,482
15	425,201	22.8	288,426
16	778,957	39.5	603,892
17	933,691	50.3	793,837
18–19	2,246,203	60.0	2,004,391

whites of native parentage was employed in gainful occupations than of negroes, foreign-born whites, or native whites of foreign or mixed parentage.

The percentage of children of ages ten to fifteen employed remained practically constant from 1880 to 1910, averaging about 18 per cent. During the following decade a decided decrease occurred; in 1920, 8.5 per cent of the children under sixteen were employed in gainful occupations, more than half of these in some form of agriculture.

The effect of such employment upon the adolescent, and

[1] See *Fourteenth Census of the United States*, vol. IV, pp. 874–1048.

the precautions to be taken to insure the maximum benefits from it, need to be studied extensively. At the present time very little is known definitely on either problem. Woolley,[1] in an extensive investigation on this problem in the case of several hundred boys and girls (ages fourteen to eighteen), in school and at work, found no differences which she could attribute to employment.

Mental defectives: feeble-minded. We have been unable to determine the number of feeble-minded and insane adolescents. In 1922, approximately 40,000 persons were inmates (pupils) in eighty-one state and private institutions for the feeble-minded, and 23,000 were enrolled in city day schools (in subnormal and opportunity classes),[2] but we do not know how many of them were in their teens. Hollingworth, Terman, and others estimate that two per cent of our population is feeble-minded.[3] If this estimate is reasonably accurate, and it seems to be, then there are more than a quarter of a million feeble-minded adolescents in the United States, of whom approximately 200,000 are not receiving any special training suited to their mental abilities.[4] The general welfare of society requires that these cases have institutional care or other close supervision.

Insane.[5] Complete data on the number of insane adolescents are not available, but approximately ten thousand of them were in hospitals for the insane in 1923, an increase over the number in 1910. By far the greater absolute and relative increases in insanity were among those of the higher

[1] Woolley, *An Experimental Study of Children.*

[2] U.S. Bureau of Education, Bulletin, 1923, no. 59.

[3] Hollingworth, *Psychology of Subnormal Children,* p. 52; Terman, *Intelligence of School Children,* pp. 125–26.

[4] This estimate may be too high because some of the feeble-minded adolescents may be gainfully employed under conditions that do provide training suited to their needs, but their number probably is not very great.

[5] *Statistical Abstract of the United States,* 1925.

age-groups, twenty-five to forty-four, forty-five to fifty-nine, and sixty to seventy-four. The increase in the extent of insanity among persons twenty-five to forty-five years of age, together with the marked progress in the study of the etiology and genesis of various forms of insanity and their treatment, serve to emphasize the fundamental importance of mental hygiene at home and at school during childhood, and at home, at school, and in the various vocations during adolescence.

Other defectives:[1] **the deaf, and the blind.** In 1920, there were a few thousand deaf-mute adolescents in the United States, probably not more than three or four thousand, most of whom were attending or had attended schools for the deaf. There were also approximately three thousand blind adolescents, many of whom were receiving or had received special training for the blind.

Delinquent and criminal adolescents. We do not know precisely how many adolescents are delinquent or criminal. Mangold[2] estimates that more than one hundred thousand children are brought before juvenile and other courts annually on delinquency charges, and that the number of delinquents receiving some form of social attention each year is greater than the number brought into court. Probably one half or more of these are adolescents. In 1922, forty thousand of the sixty-five thousand "pupils" in industrial schools for delinquents were learning some trade or other occupation;[3] the majority of them were undoubtedly in their teens. We have some statistical evidence that juvenile delinquency in the United States is not on the increase; at least smaller proportions of the population were committed to various institutions for juvenile delinquents

[1] *Statistical Abstract of the United States*, 1925.

[2] Mangold, *Problems of Child Welfare*, 1924, p. 416.

[3] U.S. Bureau of Education, Bulletin, 1924, no. 2.

TABLE 4. JUVENILE DELINQUENTS IN THE UNITED STATES IN 1910 AND 1923 *

COMMITMENTS DURING THE YEAR

Age	1910 Number	1910 Ratio per 100,000 Population of Same Age	1923 Number	1923 Ratio per 100,000 Population of Same Age
Under 10	568	2.8	344	1.6
10–17	24,854	171.6	25,565	156.5
18–20	35,697	643.6	31,086	562.9
21–24	64,221	891.7	52,766	703.9

* *Prisoners and Delinquents in United States in 1910*, Bureau of the Census, 1918; *Statistical Abstract of United States Census*, 1925.

and criminals in 1923 than in 1910; but Healy and Bronner,[1] from their first-hand contact with juvenile delinquency, find it more prevalent throughout the United States during the

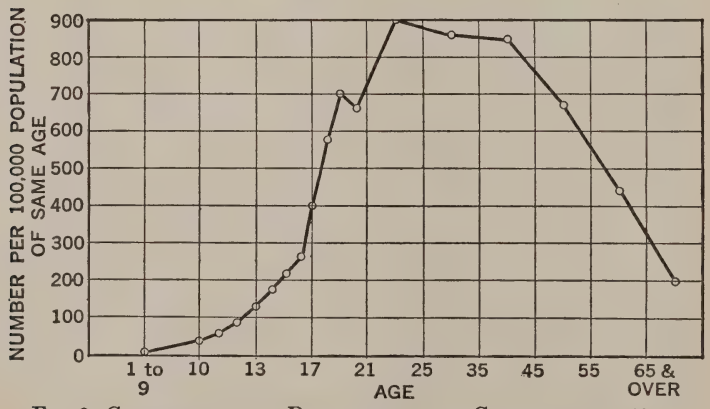

FIG. 2. COMMITMENTS FOR DELINQUENCY AND CRIMINALITY IN 1910

post-war period. Their evidence is probably a better index of its extent than are the census figures on commitments to institutions.

[1] Healy, and Bronner, *Delinquents and Criminals: Their Making and Unmaking*, p. 202.

Delinquency resulting in commitment to jail, reformatory, or other institution for juveniles is more common among the older adolescents, as we would expect (Fig. 2). About three fourths of these delinquents are boys. The most common offenses are burglary and larceny, disorderly conduct, incorrigibility, truancy, vagrancy, and delinquency.

PROBLEMS FOR DISCUSSION

1. Puberty rites for boys among primitive people.
2. Puberty rites for girls among North American Indians. Among other primitive peoples.
3. Primitive and modern secret societies.
4. Give illustrations from primitive initiatory rites showing evidence of a belief in the "new self" doctrine.
5. What adolescents should enter the secondary school? What ones should not? Why?
6. What should be done with the dull over-age pupils (i.e., adolescents) in the elementary school?
7. What differences in curricula and methods of teaching are necessitated by the increasing proportion of adolescents enrolled in high school?
8. Evil effects of child marriages.
9. The number of adolescents unaccounted for in this chapter. What are they doing? Are many of them potential delinquents?

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CHAPTER II

GROWTH IN BODILY SIZE

THE facts and significance of all phases of adolescent growth and development can be better understood if seen in relation to growth and development before adolescence. Accordingly, curves of growth during the teens are presented as continuations of similar curves for the preceding ages.[1]

1. *Sources of data on bodily growth*

Two types of data. Data from two sources are used: (1) repeated sets of measurements of the same individuals at different ages (retest data); (2) single sets of measurements of many different individuals of each age. Data of the first sort are not available for as many individuals as are those of the second sort; but they are much more reliable and significant because they show each individual's actual growth. They enable us to plot individual growth curves, which can be compared to see what features of growth are common to individuals at each age. Even combining the growth records of many individuals may give misleading results; because, if some children have their periods of rapid increase in bodily size at one age, and others have theirs at other ages, the combined records would not clearly reveal the extent of these individual variations in development.

Taking the mean of single measurements of many individuals of each age (say 10,000 twelve-year-olds, 10,000 thirteen-year-olds, etc.) permits a still less accurate estimate of the changes incident to age, since it does not enable us to

[1] Detailed data on growth and development during the first six years of the child's life have been omitted, for obvious reasons.

know the actual growth curves of any individual. It does give, however, a very general picture of growth, and it has a certain greater reliability on account of the larger number of cases studied at each age.

2. *Height* [1]

Height standing. Growth in stature is generally regular for both boys and girls. Girls probably grow a little more rapidly from nine or ten to thirteen, and boys from twelve to sixteen than at other ages, although the pre-adolescent increase in growth in height may begin a little later. (See Figs. 3 and 4 for curves, and Tables 5 and 6 for figures.) After thirteen or fourteen girls grow more slowly than at any time previously, and attain mature height probably by the twentieth year. Annual retests of college girls show little increase in height after the seventeenth year.

Boys continue to grow rapidly until the fifteenth or sixteenth year and then more slowly, probably reaching mature height sometime about the twenty-second or twenty-third year. The exact time of cessation of growth in height (and in other physical traits as well) varies among different persons. Repeated measurements show that many United States Naval Cadets are taller at twenty-two than at twenty or twenty-one; 112 out of one group of 140 were taller at twenty-two than at nineteen.

Boys are usually taller than girls, except for a year or two between the ages of eleven or twelve and thirteen or fourteen, when girls average a little taller. (See Figs. 3 and 4.)

[1] Baldwin, *Physical Growth of School Children from Birth to Maturity;* Beyer, *Proceedings of U.S. Naval Institute,* vol. 21, pp. 297–333; Galton, *Report British Association for the Advancement of Science,* 1883, pp. 253–308; Hitchcock, *Physical Growth of Amherst Students,* 1892; Hall, *Journal of Anthropological Institute of Great Britain and Ireland,* vol. 25, pp. 21–46; Schuster, *Biometrika,* vol. 8, pp. 40–51; etc.

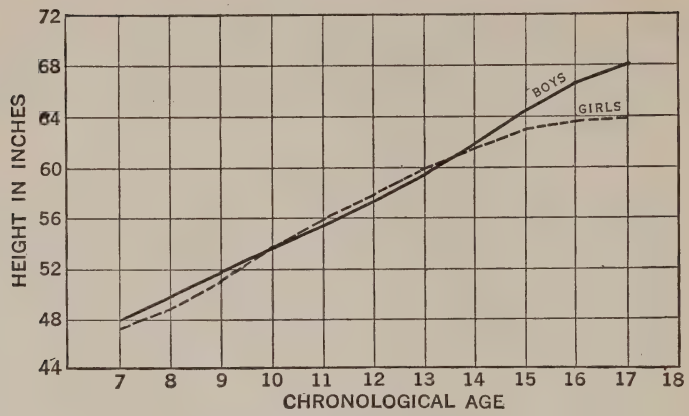

FIG. 3. GROWTH IN HEIGHT

(Baldwin.)

Fig. 3 is based upon retests of approximately 60 boys and girls at each age.

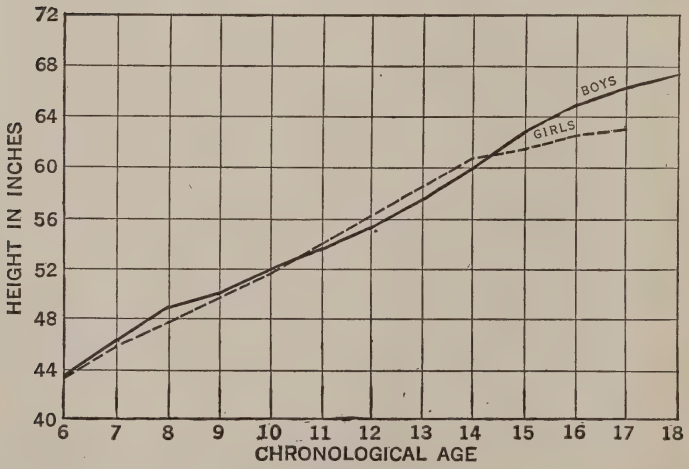

FIG. 4. GROWTH IN HEIGHT

(Boas.)

Based upon measurements of 88,000 different children.

TABLE 5. PART OF BALDWIN-WOOD WEIGHT-HEIGHT-AGE TABLE FOR BOYS, AGES SEVEN TO NINETEEN YEARS [1]

Height in in.	Chronological Age in Years: 7	8	9	10	11	12	13	14	15	16	17	18	19	Height in in.
	Weight in pounds													
38														38
39														39
40														40
41	38													41
42	39	39												42
43	41	41												43
44	44	44												44
45	46	46	46											45
46	48	48	48											46
47	50	50	50	50										47
48	53	53	53	53										48
49	55	55	55	55	55									49
50	58	58	58	58	58	58								50
51	61	61	61	61	61	61								51
52	63	64	64	64	64	64	64							52
53	66	67	67	67	67	68	68							53
54		70	70	70	70	71	71	72						54
55		72	72	73	73	74	74	74						55
56		75	76	77	77	77	78	78	80					56
57			79	80	81	81	82	83	83					57
58			83	84	84	85	85	86	87					58
59				87	88	89	89	90	90	90				59
60				91	92	92	93	94	95	96				60
61					95	96	97	99	100	103	106			61
62					100	101	102	103	104	107	111	116		62
63					105	106	107	108	110	113	118	123	127	63
64						109	111	113	115	117	121	126	130	64
65						114	117	118	120	122	127	131	134	65
66							119	122	125	128	132	136	139	66
67							124	128	130	134	136	139	142	67
68								134	134	137	141	143	147	68
69								137	139	143	146	149	152	69
70								143	144	145	148	151	155	70
71								148	150	151	152	154	159	71
72									153	155	156	158	163	72
73									157	160	162	164	167	73
74									160	164	168	170	171	74

Ages — Years		7	8	9	10	11	12	13	14	15	16	17	18	19
Average height (inches)	Short	45	47	49	51	53	54	56	58	60	62	64	65	65
	Medium	48	50	52	54	56	58	60	63	65	67	68	69	69
	Tall	51	53	55	57	59	61	64	67	70	72	72	73	73
Average annual gain (lbs.)	Short	4	5	5	5	4	8	9	11	14	13	7	3	
	Medium	5	6	6	6	7	9	11	15	11	8	4	3	
	Tall	7	7	7	7	8	12	16	11	9	7	3	4	

Individual growth curves [2] indicate: (1) that taller boys and girls reach the periods of more rapid growth and subse-

[1] Tables 5 and 6 are reprinted by permission of the American Child Health Association, New York.

[2] Baldwin, *op. cit.*; Beyer, *op. cit.*

TABLE 6. PART OF BALDWIN-WOOD WEIGHT-HEIGHT-AGE TABLE FOR GIRLS, AGES SEVEN TO EIGHTEEN

	Chronological Age in Years												
	7	8	9	10	11	12	13	14	15	16	17	18	
Height in in.	Weight in pounds												Height in in.
38													38
39													39
40	36												40
41	37												41
42	39												42
43	41	41											43
44	42	42											44
45	45	45	45										45
46	47	48	48										46
47	50	50	50	50									47
48	52	52	52	53	53								48
49	54	55	55	56	56								49
50	56	57	58	59	61	62							50
51	59	60	61	61	63	65							51
52	63	64	64	64	65	67							52
53	66	67	67	68	68	69	71						53
54		69	70	70	71	71	73						54
55		72	74	74	74	75	77	78					55
56			76	78	78	79	81	83					56
57			80	82	82	82	84	88	92				57
58				84	86	86	88	93	96	101			58
59				87	90	90	92	96	100	103	104		59
60				91	95	95	97	101	105	108	109	111	60
61					99	100	101	105	108	112	113	116	61
62					104	105	106	109	113	115	117	118	62
63						110	110	112	116	117	119	120	63
64						114	115	117	119	120	122	123	64
65						118	120	121	122	123	125	126	65
66							124	124	125	128	129	130	66
67							128	130	131	133	133	135	67
68							131	133	135	136	138	138	68
69								135	137	138	140	142	69
70								136	138	140	142	144	70
71								138	140	142	144	145	71

Age — Years		7	8	9	10	11	12	13	14	15	16	17	18
Average height (inches)	Short	45	47	49	50	52	54	57	59	60	61	61	61
	Medium	47	50	52	54	56	58	60	62	63	64	64	64
	Tall	50	53	55	57	59	62	64	66	66	67	67	67
Average annual gain (lbs.)	Short	4	4	5	6	6	10	13	10	7	2	1	
	Medium	5	6	7	8	10	13	10	6	4	3	1	
	Tall	8	8	9	11	13	9	8	4	4	1	1	

quent slower growth at earlier ages than do the shorter boys and girls; (2) that regular growth preceding adolescence is followed by regular growth during adolescence; but that slower growth before the teens is often followed by more rapid growth during adolescence; and (4) that the relative heights of children tend to remain much the same after an

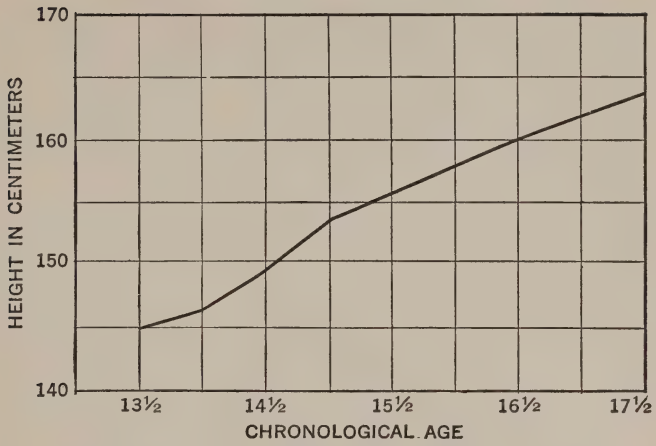

FIG. 5. GROWTH IN HEIGHT OF 100 FRENCH BOYS
(Godin.)
Consecutive measurements at semi-annual intervals.

interval of six years; i.e., that the tall children of a group at ten will be the tall ones at fifteen or sixteen, as indicated by correlations of .92 and .72 for boys and girls, respectively, at these ages.[1] The correlation between height at sixteen and at twenty-two was .67 for 140 United States Naval Cadets.

3. *Weight*

Increase in weight. Growth in weight differs from that in stature in certain respects. The curves for height are more nearly straight lines with decreasing slopes at the later teen ages, whereas weight increases at increasingly rapid rates from ages nine to fifteen for girls, and from nine to sixteen or seventeen for boys. (See Figs. 6 and 7 for curves, and Tables 5 and 6 for figures.) Girls seem to make their greatest gain in weight from eleven or twelve to fourteen or fifteen, and boys a year or two later, although the absolute gain of the latter is greater each year from twelve to fourteen than

[1] Baldwin, *op. cit.*, p. 142.

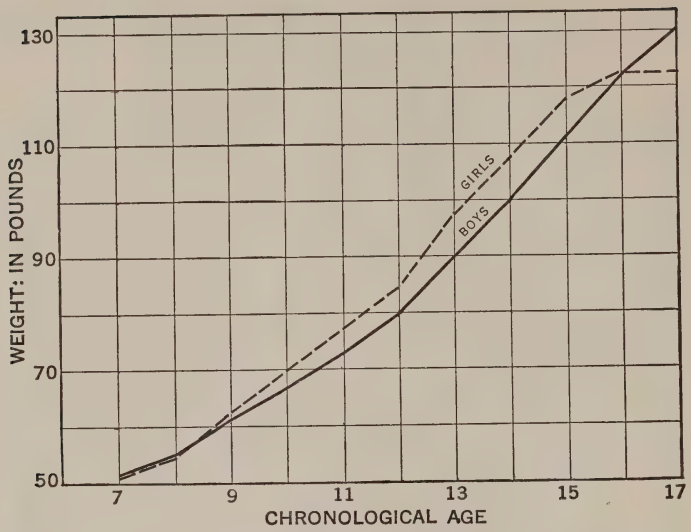

FIG. 6. GROWTH IN WEIGHT
(Baldwin.)

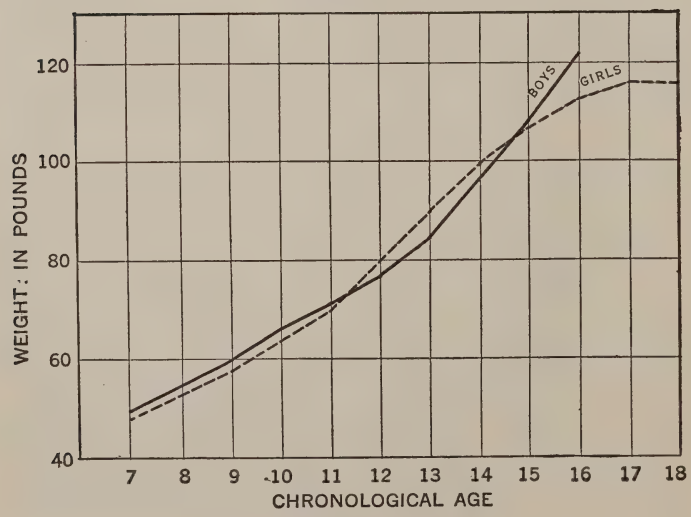

FIG. 7. GROWTH IN WEIGHT
(Burk.)

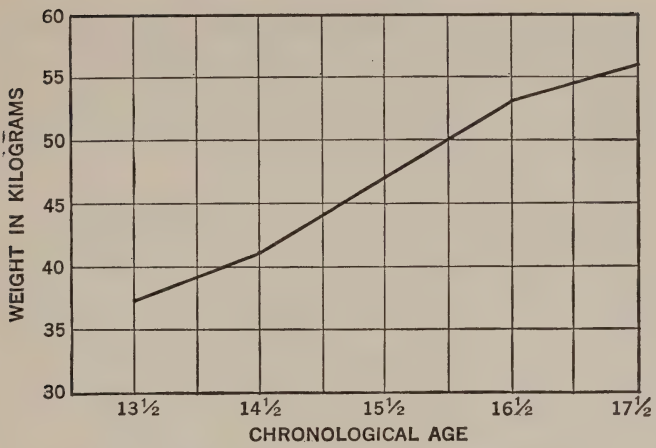

FIG. 8. GROWTH IN WEIGHT OF 100 FRENCH BOYS
(Godin.)
Consecutive measurements at semi-annual intervals.

during any of the previous six years. If, however, each year's gain from seven to seventeen is expressed as a per cent of weight at the beginning of the year (and this is important, since it shows each year's gain as a ratio of the total weight at its beginning), then the greatest increases often occur from twelve to sixteen for boys, and a year or two earlier for girls. Weight usually increases throughout adolescence, but at a slower rate after the teens. Adult weight, on the average, is approximately twenty times birth weight.

Boys are heavier than girls at most ages, except for two or three years from eleven or twelve to fourteen or fifteen, when girls are heavier.[1]

[1] Baldwin's data (*op. cit.*, p. 152) show girls heavier than boys from nine to sixteen, whereas Burk's measurements on many thousands of each age and sex indicate that girls weigh more than boys only at ages twelve and thirteen. Baldwin's results are based on repeated measurements of the same individuals, about sixty of each sex being used.

The heavier children at ten are likely to be the heavier ones at sixteen, and those who are lighter at the earlier ages are likely to be lighter five or six years thereafter, the correlations between weights at these ages being, according to Baldwin,[1] .82 for boys and .62 for girls.

4. *The head, trunk, chest, and extremities*

Growth of the head.[2] The head of the new-born child is large in proportion to the rest of his body, and grows more slowly from birth to maturity than do the trunk, legs, arms, and other parts. If the head of an adult bore the same proportions to stature and weight as it did in infancy, the person would seem a monstrosity — his head would be so huge.

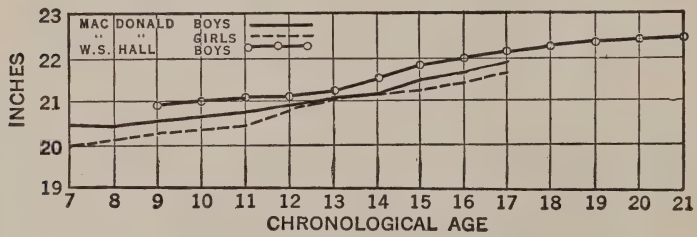

Fig. 9. Girth of Head

By the age of six, the head-girth is approximately nine tenths as large as it will be at maturity. By thirteen or fourteen there remains uncompleted but five or six per cent of growth in circumference. From birth until the middle teens the ratio of head-girth to height decreases, but it probably remains about constant after the sixteenth or seventeenth

[1] *Op. cit.*, p. 142.

[2] Godin, *Growth During School Age*, pp. 248–49; *Recherches Anthropométriques sur La Croissance*, p. 210; Hall, "Changes in the Proportions of the Human Body during the Period of Growth," in *Journal of Anthropological Institute of Great Britain and Ireland*, vol. 25, pp. 41 ff.; Roberts, *Manual of Anthropometry*, pp. 108 ff.

year. This means that the child is growing faster in height than in head-girth during the first sixteen years of his life.

The same thing is true for growth in length (height) of head. At birth the total stature is approximately four and one half times the length of head; by the age of five or six, five times; at ten, more than six times; at fifteen and thereafter it is a little more than seven times the length of the head. From birth to maturity length of head doubles, but total height or stature increases to three and one half times height at birth. At thirteen or fourteen, length (height) of head is nearly 97 per cent of that at maturity, and is practically complete by seventeen or eighteen. Then, too, we should note that most of the growth in length (height) of the head is confined to an increase in the lower or facial portions; and that the upper or cranial portion grows but little in height from birth to puberty, and still less, or not at all, thereafter.[1]

During adolescence certain changes are noticeable in the shape of the face; the lower jaw, for example, becomes broader, thicker, and more prominent.

The trunk. At maturity the trunk is approximately three times as long and wide as at birth, and not quite two and one half times as thick (diameter from front to back). By the age of six or seven it is twice as long and wide as at birth, and it is much thicker. From six or seven until the beginning of adolescence, length and width increase about half as much as during the first six years. During adolescence the increase is about the same as during the six years immediately preceding. The rate of growth is greater during the earlier half of adolescence than later. The adolescent acceleration occurs one or two years earlier among girls than among boys. At birth the trunk forms a larger proportion of total stature than at any later time; it is also wider in proportion to stature than at any time from then until maturity.

[1] See page 37 for evidence that brain capacity increases after the teens.

The chest. During adolescence the chest widens, deepens, and becomes longer, but its greatest growth is in length and width. The most rapid growth in girth occurs from about the fourteenth to the sixteenth or seventeenth years among boys, and approximately two years earlier among girls. Growth-curves for chest girth resemble those for height, but they are much more like those for weight. Investigation also has shown that weight is more closely related to chest girth during the school ages than height is,[1] indicating, as we would naturally suppose, that stockiness of build rather than height is the better index of weight during adolescence.

The relative standings of the two sexes are much the same as in the case of height and weight. Girls exceed boys in chest girth during early adolescence, but their rate of growth declines sharply at about fifteen, after which boys soon overtake and surpass them. Part of the increase in chest girth is due to growth of the thoracic cavity, but some of it is due to changes in subcutaneous fat and muscles. Growth curves for circumference of chest are quite similar to those for girth of abdomen, pelvis, and hips.

The lower extremities.[2] At puberty the legs are approximately four times as long as at birth; at maturity, five times.

[1] Baldwin, *op. cit.*, pp. 120–21. At every year during adolescence the boys' weight-chest-girth correlations exceeded their height-chest-girth correlations by amounts ranging from fourteen to thirty-one points; the average difference from thirteen to seventeen was twenty-three points. The girls' weight-chest-girth coefficients of correlation exceeded their height-chest-girth coefficients from thirty-seven to fifty-five points; the average difference was forty-six points for the years from twelve to seventeen. The boys' mean correlations, ages seven to seventeen, were .859 and .655, respectively; the girls' were .895 and .465, respectively.

[2] Baldwin, *op. cit.*, pp. 152 ff.; Godin, *Growth During School Age*, pp. 248 ff.; *Recherches Anthropométriques sur La Croissance*, pp. 210–12; Hall, *op. cit.*, pp. 41–42; Roberts, *op. cit.*, pp. 112 ff.; Hitchcock, *Physical Growth of Amherst Students.*

Growth is most rapid during infancy. The increase in length during the first three years is approximately one half that of the next nine years, and is nearly equal to that of the six or eight years after twelve. The rate of growth seems also to be somewhat more rapid during the early teens than during the two or three years immediately preceding or following. Sex differences, similar to those noted in the case of height, are found.

5. *Growth of the skeletal system*

Bone growth and structure. Adolescence is marked by certain changes in the size and structure of the bones, in addition to those already mentioned. The bones of the extremities grow longer and thicker; the lower jaw becomes heavier and stronger; the pelvis becomes broader in relation to its length, especially among girls. The long, narrow, straight pelvis of early girlhood becomes finally broad and relatively shallow during the teens. The changes in shape of pelvis are much greater among girls than among boys.

Chemical analysis seems to indicate little difference between children and adults in the composition of the osseous tissue; but the chemical composition of the bone (osseous tissue, cartilage, etc.) of the child differs from that of the adult chiefly in having a larger proportion of animal matter and less mineral matter, and being somewhat more spongy. By the beginning of adolescence the ossification of the bones is far advanced, and probably is completed sometime about twenty. Girls at all ages from five to seventeen are a year or two in advance of boys in ossification of bones. X-ray photographs [1] indicate that sometime about nineteen or twenty the ossification ratios of the sexes are equal.

[1] Freeman and Carter, in *Journal of Educational Psychology*, vol. 15, p. 263.

6. *The muscular system*

Muscle growth. As boys and girls become adolescent the proportionate weight of the muscles to total body weight rapidly increases. The circumferences of the forearm, upper arm, calf, and thigh increase largely through muscular growth. The rounding out of the figure into adult proportions is accomplished by additions of adipose tissue and growth of the muscles, and follows the rapid growth in height. At birth the total musculature weighs less than one fourth as much as the entire body (23.4 per cent); at eight it may be approximately 27.2 per cent; at fifteen, 32.6 per cent; but at sixteen, 44.2 per cent of total weight. This rapid adolescent growth in muscle has led many observers to neglect the significance of the more gradual growth of other parts.

Changes in muscle fibers may also occur during these years, the fibers becoming both thicker and longer (Köllicker, Westphal, MacCollum).[1] At maturity a fiber may be as much as five or more times as thick as at birth, this growth in thickness accounting for much of the growth of the skeletal muscles.

7. *The circulatory system* [2]

The heart and blood vessels. The blood vessels not only grow in length and area of cross section, but their walls also become thicker and of stronger texture during the teens.

Numerous studies of the growth of the heart have been made, either by the X-ray method of Bardeen or in the dissection rooms of anatomical laboratories. Painstaking care

[1] See Feldman, *Principles of Ante-Natal and Post-Natal Child Physiology*, pp. 350–51.

[2] Bardeen, in *American Journal of Anatomy*, vol. 23, pp. 463 ff.; Bean, *Contributions to Embryology*, vol. 9, no. 37, pp. 263–84; Vierordt, *Anatomische, Physiologische, und Physicalische Daten und Tabellen*, pp. 36–37.

has been taken in the latter case to omit consideration of all cases in which pathological conditions would affect the size or weight of the heart. Data combined from several of these sources give a fairly reliable rough outline of its

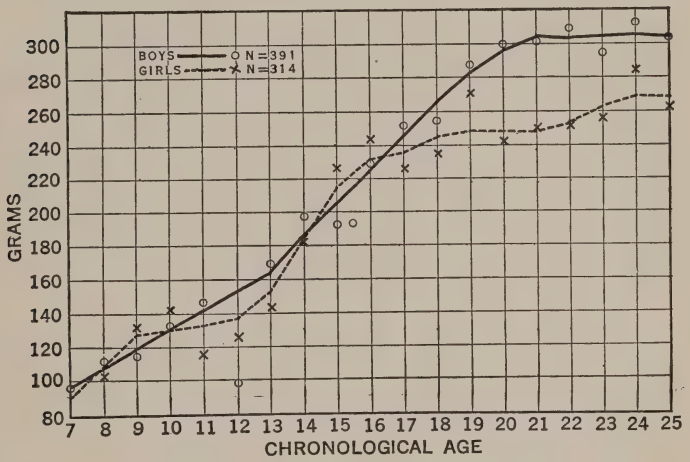

FIG. 10. WEIGHT OF HEART AT DIFFERENT AGES
(Bean, Vierordt, *et al.*)
Curves smoothed.

growth in weight. (See Fig. 10.) At six years of age the child's heart probably weighs four or five times as much as at birth; at twelve, about seven times as much; at eighteen, about ten to twelve times; and at twenty, it is somewhat heavier than before. During the teens the ratio of the volume of heart muscle to length of the body (i.e., height) increases approximately twice as fast as before adolescence, even though the earlier years of adolescence are a time of rapid growth in stature.

The muscle fibers of the heart also change during the teens, increasing in size and probably in the number of con-

tractile fibers.[1] Blood pressure increases at the onset of puberty, due to an increase in the ratio of heart volume to size of the aorta. (See Fig. 11.)

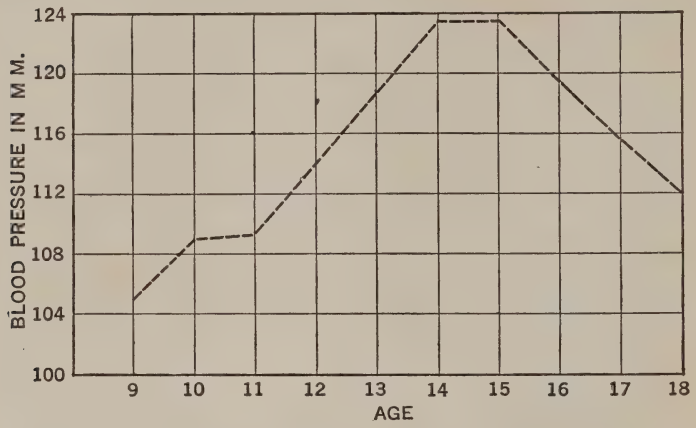

FIG. 11. BLOOD PRESSURE (SYSTOLIC) OF GIRLS DURING ADOLESCENCE (Burlage.)
N = 1033.

The blood undergoes changes in composition, although too few data are available to warrant any conclusive statements.

8. *The reproductive system*

Growth of the reproductive system.[2] During childhood the organs of reproduction grow slowly, but with the onset of puberty they develop rapidly both in size and internal structure, and become functionally mature. Accompanying maturation are many secondary sex characteristics whose appearance and development are dependent upon the normal growth and health of the reproductive system, especially of the sex glands. Among boys at puberty, hormones secreted

[1] Vierordt, *op. cit.*, p. 108. [2] Feldman, *op. cit.*, pp. 634–38.

by the interstitial cells of the testes (not from the reproductive cells) seem to exert a marked influence upon the breaking of the voice, upon the growth of hair upon the face and pubes, and upon the growth of the long bones by affecting their rate of ossification.

Among girls at puberty such secondary sex characteristics as the appearance of pubic hair, the growth and development of the breasts, and changes in voice are dependent upon hormones secreted by the interstitial cells of the ovaries. Osseous growth seems also to be influenced by the ovaries. Abnormal growth and premature sexual development sometimes result from tumors of the sex organs of children.

9. *The digestive system*

During adolescence the stomach becomes longer and less tubular, the esophagus increases in size, and the intestines grow in length and circumference. The muscular portions of the walls of both stomach and intestines become thicker, so that the peristaltic movements are probably stronger. The liver increases rapidly in weight during the early half of adolescence, its growth curves (see Fig. 12) resembling closely those of height (see Fig. 3). At maturity the liver weighs approximately twelve times as much as at birth, whereas total adult weight averages twenty times birth weight.

10. *The respiratory system*

Growth of the lungs. The lungs share in the general adolescent growth, increasing both in volume and weight, as we would naturally expect them to in order that they may keep pace with the greater demands placed upon them during these years of rapid growth. Growth probably continues until near the close of adolescence, boys probably surpassing girls at nearly all ages.

11. *The nervous system*

Available data inadequate.[1] Because of the importance of the nervous system in the life of an individual, it would be interesting to know precisely what changes take place in it

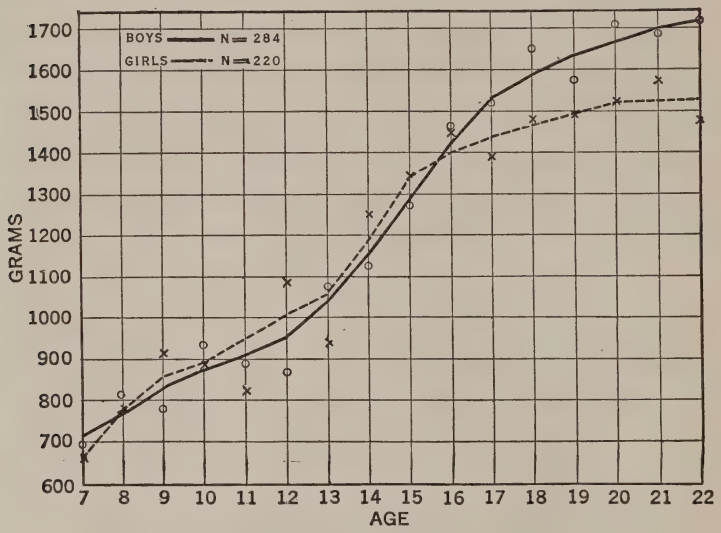

FIG. 12. WEIGHT OF LIVER

(Bean, Vierordt, *et al.*)

Curves smoothed. These curves are based upon too few cases to be an accurate indication of growth. Accordingly, we cannot be sure about the sex differences which they reveal.

during the teens and to know just what is their significance, but unfortunately very little is known about nerve physiology which throws any light on such problems.

Development of immature nerve cells. Apparently, the growth of the nervous system during post-natal development

[1] Berry and Porteus, *Training School Bulletin*, vol. 15, pp. 81–92; Donaldson, *Growth of the Brain*, especially pp. 68 ff.; MacArthur and Doisy, *Journal of Comparative Neurology*, vol. 30, pp. 445–86; Porteus, *Journal of Applied Psychology*, vol. 8, pp. 57–74; Porteus and Babcock, *Temperament and Race*, especially chap. 11.

is not accomplished by the formation of new cell elements, but by the development of immature cells, present at birth, but functionally inactive. Vierordt presents some evidence that the diameters of certain large peripheral nerve fibers are two or three times as large at the age of two or three as at birth, and probably three or four times as large at maturity. If these proportions are correct, the sectional area of these fibers increases as much during the first two or three years of a child's life as during the next eighteen or twenty. Of course the neurons continue to grow in length as long as general growth continues,[1] probably also increasing somewhat their transverse diameters.

Growth of the brain. Determining the growth curves of the brain or other portions of the nervous system is a very difficult task, presenting obstacles which make the results much less accurate and less reliable than those discussed in the first part of this chapter. Our sources of information are of two sorts: (1) brain weight can be determined by weighing the brain of the dead; (2) brain volume can be estimated from certain measurements of the cranium of the living. Obviously, weighing the brains of the dead is a method that does not yield individual growth curves; furthermore, it is limited to providing data upon a selected group — the dead — who, so far as non-accidental causes of death are concerned, probably are not strictly comparable with the living of the same ages.

Estimates of brain volume from cranial measurements of the living have not yet been secured by re-measuring a group of individuals at several successive ages to determine individual growth curves. Then, too, there are problems of technique relating to allowances for any increase in the thickness of the skull bones, for the space between the brain and its surrounding membranes, or for other inaccuracies of

[1] Donaldson, *Growth of the Brain*, pp. 150, 152.

measurement when data are secured from persons of various ages.

According to our first kind of evidence, the brain grows most rapidly during the first four years, more slowly during the next four, and then *very* slowly. By the beginning of

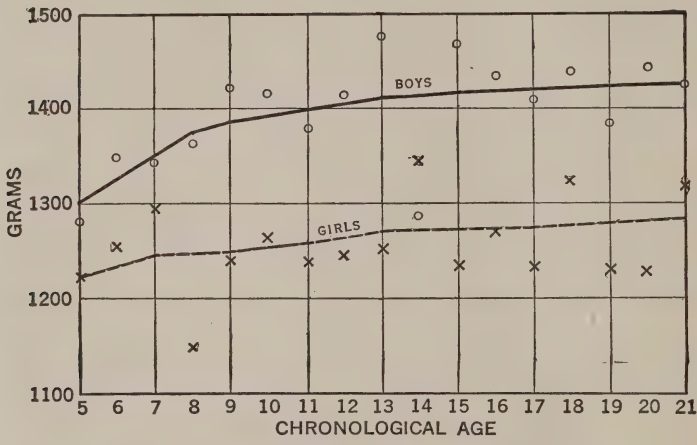

FIG. 13. BRAIN WEIGHT AT DIFFERENT AGES

219 boys; 215 girls.

(Vierordt.)

Curves smoothed. The unreliability of these curves becomes apparent when we note the irregular distribution of the small circles and crosses, which represent the mean weights at the different ages.

adolescence it has nearly attained adult weight. While the brain may increase in some cases until the age of twenty or twenty-five, the amount is likely to be almost imperceptible after the age of fourteen or fifteen. Probably at all ages boys' brains are heavier than girls'. (See Fig. 13.) We should add, however, that the organization of cortical tissues probably is of greater significance for mental life than mere size of brain.

At birth the brain weighs approximately one eighth as much as the entire body; at ten, about one eighteenth; at

fifteen, about one thirtieth; and at twenty, about one-fortieth. It grows much more slowly than many other organs. At maturity it is less than four times as heavy as at birth,

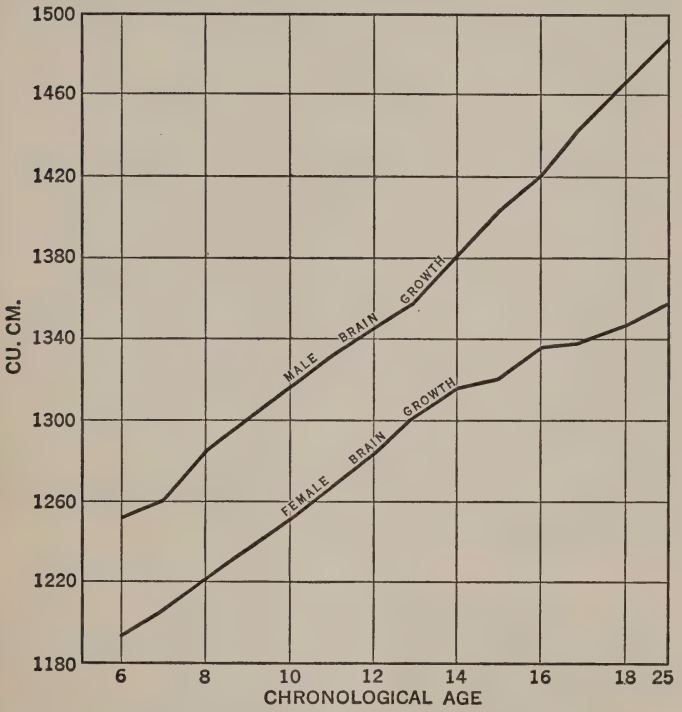

FIG. 14. GROWTH OF THE BRAIN IN VOLUME
(Porteus.)

whereas the heart, liver, lungs, etc., are from ten to eighteen times their birth-weight.[1]

From cranial measurements of school children and university students in Australia, Berry and Porteus [2] calculated brain volume and concluded that it increases from six to twenty-five years, as shown in Fig. 14, although the appar-

[1] Donaldson, *op. cit.*, p. 70. [2] *Op. cit.*

ent growth after sixteen may be partly due to inaccuracies known to be associated with this method of measurement.

From birth until late adolescence the spinal cord grows more rapidly than the brain, or any of its larger subdivisions; its growth in length obviously parallels that of the trunk.

PROBLEMS FOR DISCUSSION

1. The effect of malnutrition upon growth in height and weight.
2. Differences in growth of various parts of the body.
3. Sex differences in growth in bodily size.
4. What effects does exercise have upon growth?
5. Are there periods of rapid growth? If so, when do they occur? What factors determine when they shall occur?
6. The use of the Baldwin-Wood Weight-Height-Age table in furthering the physical well-being of children.
7. Growth of the brain in relation to mental development.
8. Significance of sex differences in size of brain.
9. Gigantism.
10. The factors determining adult height, weight, or chest girth.
11. Evidence from individual growth curves indicating an increased rate of growth in height and weight at puberty.
12. Relation of rapid growth to fatigue.

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CHAPTER III

THE DEVELOPMENT OF PHYSICAL AND MOTOR CAPACITIES

1. *Maturing of the sex functions*

Maturation of boys. Various criteria have been employed to determine the beginnings of puberty among boys. The pubescent growth and pigmentation of fine hair are often taken as the sign of approaching maturation, although it is hardly adequate to determine precisely the first secretion of the sperm cell. Accordingly, a better method or criterion is being sought. The change from a-sexual to sexual life is accomplished in a very short time, usually from six months to a year. The dawn of puberty occurs at no one or two chronological ages exclusively. At any one age not more than forty or fifty per cent of the boys are likely to be maturing; the others are either pre-pubescent (immature) or post-pubescent (matured).

In an investigation [1] of nearly five thousand boys it was found that those from the country matured approximately six months earlier than city boys, the modal ages of the first sign of puberty being thirteen and a half and fourteen years, respectively. Great variability in chronological age is noted for all three stages of pubescence. One perfectly normal boy of eleven may show no signs of pubescence, whereas another eleven-year-old boy, also normal physically, may be approaching post-pubescence. On the other hand, a fifteen-year-old normally developed boy may be post-pubescent, whereas another boy of the same chronological

[1] Baldwin, *op. cit.*, p. 189.

age and equally normal physically may be immature, as we may see from the following summary of Baldwin's investigation:

Stage of Maturation	Age Range of Country Boys	Age Range of City Boys
Pre-pubescent	$8\frac{1}{2}$ to 16 years	$9\frac{1}{2}$ to $17\frac{1}{2}$ years
Pubescent	$9\frac{1}{2}$ to $15\frac{1}{2}$ years	10 to 18 years
Post-pubescent	$11\frac{1}{2}$ to 24 years	$12\frac{1}{2}$ to 24 years
The modal age for pubescence	$13\frac{1}{2}$ years	14 years

In a study of pubescence among nearly four thousand high school boys in New York, Crampton[1] found that 41 per cent of the $13\frac{3}{4}$-year-old boys were immature, 28 per cent maturing, and 31 per cent matured, and that 26 per cent of the $14\frac{1}{4}$-year-old boys were immature, 28 per cent maturing, and 46 per cent matured.

Maturation of girls. Among girls the commonly accepted criteria of puberty are undoubtedly more valid than those used with boys. The evidences of sexual maturing are the first menstrual flow, enlargement of the breasts, the appearance of subcutaneous fat, and axillary hair. The median chronological age of maturation is approximately $13\frac{1}{2}$ to $13\frac{3}{4}$ years for American girls, but the age at which puberty begins also varies greatly among girls who are normal physically. The wide range of chronological ages at which girls first menstruated is seen in Table 7, a summary of Atkinson's data on nearly seven thousand high school girls. The median chronological age is 13 years, 9.6 months. More than one third of this group matured between the ages of thirteen and a half and fourteen and a half years. In a study of nearly four hundred girls, Baldwin found one third maturing during their thirteenth year.

Girls are supposed to mature a year or two earlier than

[1] *American Physical Education Review*, vol. 13, pp. 144–54, 214–27, 268–83, 345–58.

TABLE 7. AGE OF SEXUAL MATURING OF GIRLS

(Calculated from Atkinson's Data.)

CHRON. AGE	NUMBER	PER CENT
11^6–12^5	220	3.2
12^6–13^5	1050	15.3
13^6–14^5	2717	39.5
14^6–15^5	2162	31.4
15^6–16^5	640	9.3
16^6–17^5	86	1.3
Total	6875	100.0

boys, but the data we have presented show nearly the same median and modal ages for both sexes. Undoubtedly, the criterion for boys is not as exact or does not represent as advanced a stage of maturation for boys as it does for girls. Dr. Godin [1] has regarded puberty as definitely established among boys when: (1) the downy pubic hair gives way to the thicker, kinky growth; (2) the voice changes; and (3) hair appears in the armpits. From nine observations on a hundred French boys, repeated semiannually beginning at the age $13\frac{1}{2}$, he found downy pubic hair appearing, on the average, at $14\frac{1}{2}$ years, but all three criteria mentioned above were not present until $15\frac{1}{2}$ years — the age which he regards as the average for the establishment of puberty among boys. This stage of sexual development probably is reached by American boys at the average age of approximately $14\frac{1}{2}$ or 15 years.

Terman and Baldwin [2] present evidence indicating that children of superior mental ability probably mature somewhat earlier than those of less ability. Children from well-to-do homes, of the upper social classes, generally mature a year or two in advance of those of the poorer classes. Taller, heavier, and larger boys and girls often mature

[1] *Recherches Anthropométriques sur La Croissance*, pp. 180 ff.

[2] Terman, *Genetic Studies of Genius*, vol. I, pp. 205 ff.; Baldwin, *op. cit.*, pp. 188 ff.

earlier than smaller ones of the same chronological age.[1] The popular notion that early maturation is a sign of poor health has little evidence to support it, aside from reasoning by analogy from very dubious parallels.

Factors influencing onset of maturation. Many factors affect the onset of maturation and the extent of adolescent growth; race, immediate family heredity, sex, disease, nutrition, mental health, sleep, rest, overwork, exercise, etc., are the more important ones.

2. *Development of breathing capacity*

The vital capacity of boys and girls.[2] Breathing capacity, measured by using the wet spirometer, is lung capacity minus residual air — the maximum amount of air that can be expired after a maximum inspiration. Such measurements are influenced to some extent by the mental and voluntary effort of the children tested, and may not have quite equal accuracy for all individuals examined. The breathing capacity of both boys and girls increases rapidly at the dawn of puberty, and during the year or two immediately preceding it. In fact, it increases more rapidly during a four- or five-year period at this time than during any other equal period before or after it. The more rapid rate of increase is likely to appear a year sooner among girls than among boys. On the average, boys have greater breathing capacity than girls before, during, and after adolescence. Boys' breathing capacity also increases more rapidly during the teens than does that of girls. At seventeen girls have almost reached adult vital capacity, but boys develop considerably after this age. (See Fig. 15.) Accordingly, the difference between the vital capacities of boys and girls becomes increasingly greater from the thir-

[1] Terman, *op. cit.*, pp. 170–71; Baldwin, *op. cit.*, pp. 191 ff.

[2] See the work of Baldwin, Beyer, Hitchcock, and others.

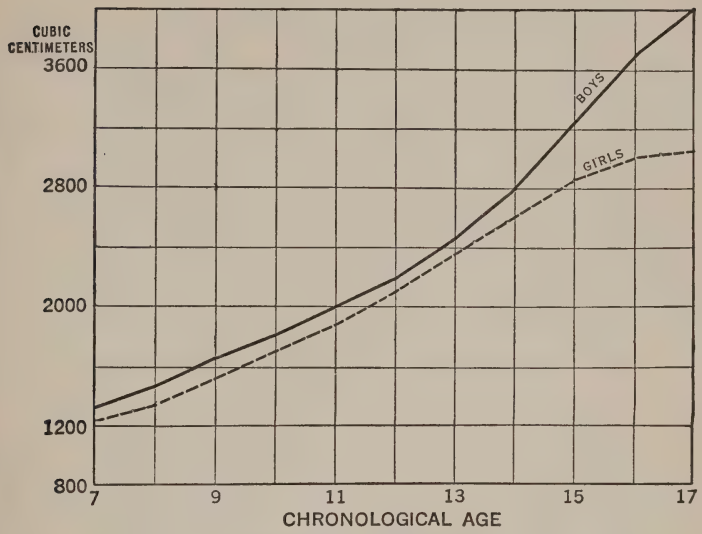

FIG. 15. DEVELOPMENT OF BREATHING CAPACITY
(Baldwin.)

teenth year until the cessation of growth in the early twenties.

Relation of breathing capacity to height and weight. Breathing capacity is closely related to height and weight, both before and during adolescence, as we would expect it to be. The tall, heavy child should have greater breathing capacity in order to meet the greater demands upon his respiratory system. Adolescent development does not modify very much the relationship between vital capacity and height and weight, the slight differences between the average correlations for the two periods, seven to twelve, and thirteen to seventeen, are not large enough to be very significant.[1] Probably the most significant difference is

[1] According to Baldwin, boys' vital capacity and height correlated .778 at the earlier period and .704 during the adolescent ages; for girls, .628 and .718, respectively. Vital capacity and weight correlated .729 and .730 for boys at the two age periods, seven to twelve, and thirteen to seventeen, respectively, and for girls, .539 and .491, respectively.

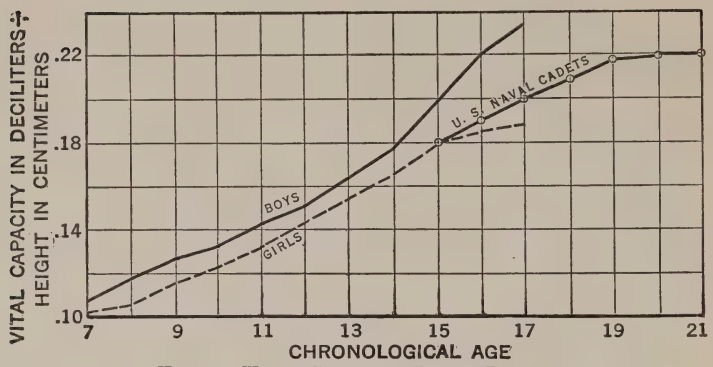

FIG. 16. VITAL-CAPACITY-HEIGHT INDEX
(Baldwin.)

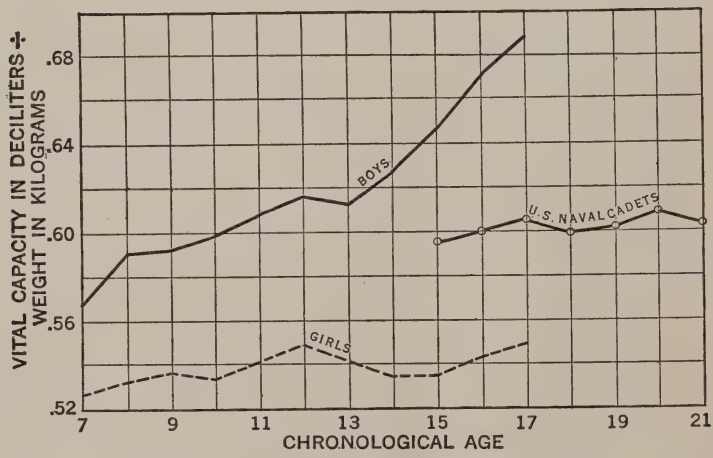

FIG. 17. VITAL-CAPACITY-WEIGHT INDEX
(Baldwin.)

that breathing capacity is much more closely related to weight among boys than it is among girls.

The vital-height and vital-weight ratios. On the other hand, the ratios of breathing capacity to height and weight

do change during adolescence, and the changes are of importance because they reveal an increase or decrease in the adequacy of the lungs to meet the respiratory needs of the body. On the average, lung capacity at seventeen bears a larger ratio to height than at any time during the preceding ten years. The ratio of breathing capacity to height (vital-height index) seems to increase steadily from seven to seventeen for both sexes (see Fig. 16), and it probably increases for boys until the early twenties (Beyer, Hitchcock). Among girls it probably does not increase a great deal, on the average, after seventeen or eighteen. The index for boys is larger than that of girls at all ages, with greater differences at the later years of adolescence.

During the teens the breathing capacity of boys bears a larger and larger ratio to weight, but its ratio to weight among girls does not show any similar increase (see Fig. 17). The vital-weight index probably reaches its maximum in the teens. Among Amherst men, for example, it was the same in the freshman as in the senior year. Boys are superior to girls at all school ages in this index, and the differences become increasingly greater during the high school years.

3. *The development of muscular strength*

Rapid increase in muscular strength during adolescence. Muscular strength is greatly modified by environmental conditions, such as exercise, nutrition, rest, etc. It also is more variable than height, chest girth, sitting height, head circumference, and similar measurements. In fact, breathing capacity, weight, and the various measures of strength are likely to show much larger coefficients of variation than stature, girth of head and chest, and similar measures at all ages from seven to maturity. Probably the most significant fact about the development of strength during adolescence is not its great increase, nor the superiority of boys to girls

at all ages, nor even the increase in the rate of development beginning about twelve or thirteen among boys (although these commonly characterize the development of the various muscular strengths during the teens); but rather that

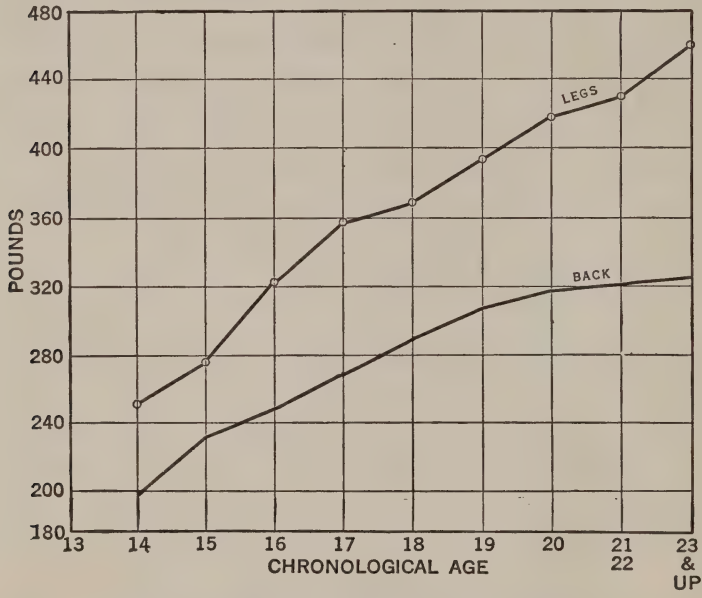

FIG. 18. STRENGTH OF BACK AND LEGS OF BOYS
(W. S. Hall.)

muscular power continues its rapid increase until the later ages of adolescence, especially among boys. At eighteen or nineteen growth in bodily size is more nearly complete than is development of various kinds of muscular strength. The boy of eighteen is nearer manhood in height than in strength. This is to be expected, since development of power naturally follows growth in size; that is, development of structure precedes that of function. Amherst college men gained more in muscular strength from freshman to senior year

(average ages nineteen years, and twenty-two years, five months, respectively) than in any other physical measures. The increases during these three and one half years were as follows:

Bone structure	1.31 per cent
(Heights; girth of head, hips, knee, elbow, and wrist)	
Muscular size	4.47 per cent
(Girth of neck, thigh, calf, forearm, etc.)	
Vital organs	4.51 per cent
(Girth of chest and waist, lung capacity, etc.)	
Bodily weight	7.42 per cent
Muscular power	24.90 per cent
(Strength of back, legs, and forearm; dip, pull-up, etc.)	

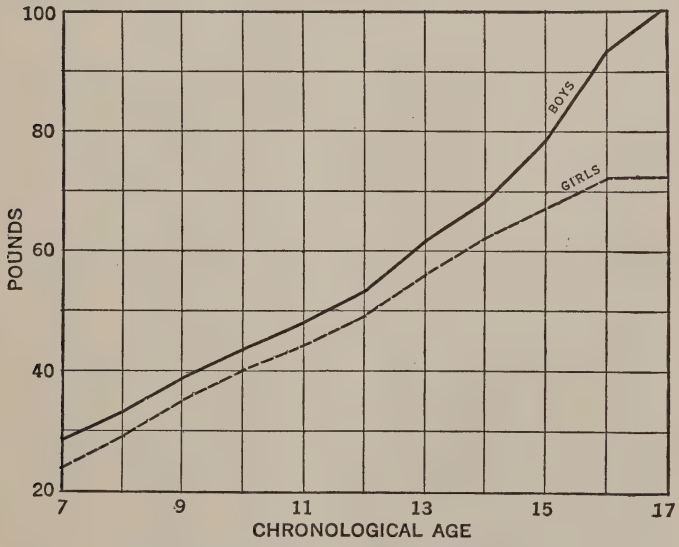

FIG. 19. STRENGTH OF GRIP, RIGHT HAND
(Baldwin.)

The muscles increased so much more in strength than in size that we are led to believe the difference was probably

caused by changes in the muscle-fibers, partly resulting from the active physical life of college men.[1]

The curves of Figs. 18 and 19 suggest that girls have almost attained adult strength by the time they reach their seventeenth birthday, but that the strength of boys increases four or five years longer, with, of course, numerous individual variations.

The ratio of strength to height and weight. During each year from the age of seven until maturity the child's strength seems to increase more rapidly than his height; that is, the ratio of strength to height appears to be larger each year than it was the preceding one, with a more rapid increase in the early teens. Boys' indices are usually larger than girls' throughout adolescence as well as during the school ages preceding it.

Strength seems to be much more in proportion to weight among boys than among girls, whereas height correlates just a little more closely with strength for boys than for girls, although we should note that the mean correlations thus far obtained for the years thirteen to seventeen are not large enough to predict strength accurately from either height or weight. On the basis of Baldwin's data, predicting a boy's strength from his weight would be, in the long run, about 23 per cent more accurate than mere guessing, whereas predicting it from his height would be but 13 per cent more accurate than guessing. If, however, we tried to estimate an adolescent girl's muscular strength from her height or her weight, we would secure an estimate 9 or 10 per cent more accurate, respectively, than from mere guessing.

Manifestly all the forces which affect a child's muscular

[1] "When exercised, the skeletal muscle acquires new cells." — Burton-Opitz, *Textbook of Physiology for Students and Practitioners of Medicine*, p. 1114.

strength do not determine his height or weight at any one age, and furthermore, some of the determining factors are not present to the same extent or with equal potency among all individuals. For example, exercise affects strength very much, but it probably has little influence on height.

4. *Motor capacities*

Progressive growth and development. Growth and development are fundamental characteristics of infancy, childhood, and youth. Immaturity implies further growth or development. Not only does the adolescent grow in various features of bodily size and proportions and come to have greater muscular strength, but he also has greater motor abilities. Motor capacities are much influenced by training. Normally, the environmental conditions, although extremely varied, are such that we would expect the youth at eighteen to have greater motor skill than at fourteen or ten. We would expect him to have greater speed, accuracy, steadiness, etc., except in so far as unusual conditions had affected his development.

In the relatively few cases of such serious disorders as chorea or St. Vitus's dance, and the like, motor skill would, of course, be impaired; but under normal circumstances it probably would increase at least during the first half of adolescence. Furthermore, our knowledge of individual variation indicates that some adolescents develop more rapidly than others, and that motor skill increases longer for some than for others. No one rate of growth is typical of all individuals, nor do they all cease development at any one chronological age.

Information on motor development inadequate. Unfortunately, our information on the development of any one or more phases of motor skill is quite fragmentary and inadequate, since individual growth-curves are not available, and

few studies have been made of many persons of different ages.[1] Very limited or narrow aspects of motor capacity have been selected for investigation by psychologists, so that we have very meager knowledge of the more complex forms, the ones that are involved in the work-a-day world.

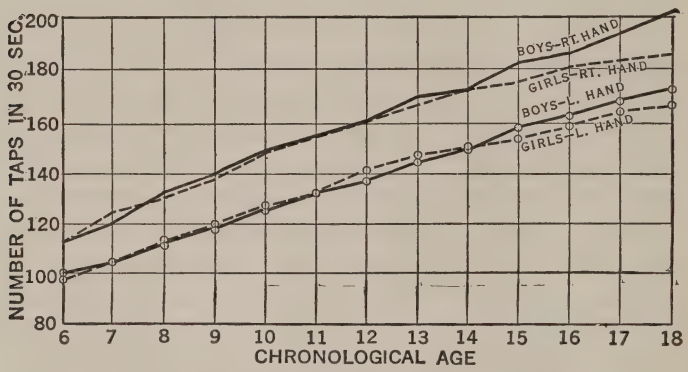

FIG. 20. VOLUNTARY MOTOR ABILITY: TAPPING 30 SECONDS
4197 boys; 4526 girls.
(Pyle.)

Speed of voluntary movement. What evidence we have, however, indicates a continued increase in the speed of tapping (number of taps made by the finger in a short interval of time, say from thirty to sixty seconds) until the sixteenth or eighteenth year, but at slower rates after the thirteenth or fourteenth year. In fact, by the age of eight the speed seems to be about two thirds as rapid, and at thirteen, six sevenths as rapid as at seventeen.

[1] Bryan, *American Journal of Psychology*, vol. 5, pp. 125–204; Gilbert, *Studies from Yale Psychological Laboratory*, vol. 2, pp. 44–100; Gilbert, *University of Iowa Studies in Psychology*, vol. 1, pp. 1–39; Smedley, *Report Department of Child Study and Pedagogic Investigation*, no. 3, 1900–1901 (Chicago Public Schools). In Chapter IV the medians of individual rates of improvement in speed of handwriting are given, but that is a somewhat different sort of capacity from those we are discussing here.

Voluntary muscular movements involving the joints at shoulder, elbow, and wrist reach their maximum capacity for speed sometime after the dawn of puberty — we do not know precisely when — although the development after thirteen or fourteen may be slight. According to available data, speed of moving the entire arm (swinging it from the shoulder, back and forth very much as in walking, except that the forearm is at right angles to the upper arm) is much nearer the adult level at six than is speed of voluntary finger movement; but further experimental evidence is needed to be sure of the course of development.

On the average, boys probably excel girls at all ages, as shown in Fig. 20; but individual scores vary so much from the averages represented by the curves of this figure that at any age many girls excel a great many boys of the same age; for example, Thorndike [1] has estimated from Gilbert's data that from ages eight to fourteen 36 per cent of the boys do not reach the girls' median speed of tapping, and from fifteen to seventeen 27 per cent of them tap more slowly than the median girl; i.e., half of the girls, ages eight to fourteen, make better scores than the slowest third of the boys; and half of the girls from fifteen to seventeen years of age do better than the slowest fourth of the boys.

Accuracy of movement. Is the sixteen-year-old more accurate in his motor responses than he was at fourteen? Will he be still more accurate at eighteen and twenty? When will his motor capacities cease to improve in this respect? We do not know. The familiar tracing and aiming experiments of the psychological laboratory show some adolescent development but not much. The amount of gain after fourteen is indeed small, but it may be larger than that revealed by the experiments which have been confined to such limited phases of motor accuracy. The smoothed curves of Fig. 21

[1] *Educational Psychology*, vol. III, pp. 182–83.

indicate the results of a painstaking investigation of the motor precision of seven hundred children.[1]

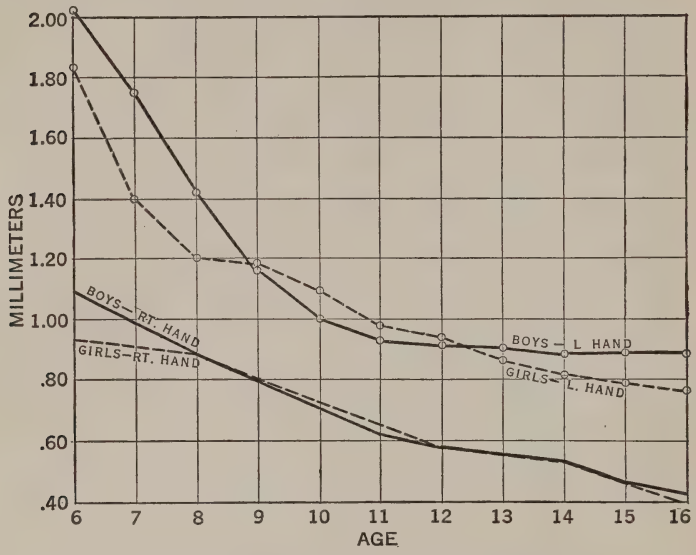

FIG. 21. PRECISION OF VOLUNTARY MOVEMENT
(Bryan.)
Curves smoothed.

Steadiness of motor control. Steadiness of motor control has been measured in the laboratory by determining how little involuntary movement is present when the finger, hand, arm, or entire body is held as nearly motionless as possible. Improvement comes with age and probably continues into adolescence, but the rate of increase and the average age of cessation of development are unknown for the simple reason that individuals have not been retested, year after year, to find out either their rates of growth or the ages at which the majority of individuals normally reach the

[1] Bryan, *American Journal of Psychology*, vol. 5, pp. 125–204.

adult level. The direction of attention partly determines an individual's score.

Muscular fatigue. Adolescent development is characterized by a continued decrease in the amount of motor fatigue, if by fatigue we mean a decrease in the amount of work done in a given time.[1] Narrow experiment and wide observation alike indicate that coming to manhood and womanhood normally involves that development of motor capacities — strength, speed, and accuracy — by virtue of which the individual not only is stronger but also has greater effective endurance of effort than he ever had before. Consequently, a boy should be able to perform a given motor task for a given length of time with less loss of efficiency at eighteen than at twelve, fourteen, or sixteen. Of course, changing from a very active to a sedentary life during adolescence would modify the individual's susceptibility to fatigue in respect to any motor functions influenced by the change.

The indices of fatigue for rate of tapping[2] do not decrease much after the fourteenth year. If, however, we mean by fatigue the decrease in number of taps of the last five seconds from that of the first five, then it diminishes little during adolescence.

The relative fatigue of boys and girls, shown in Fig. 22, probably is misleading in some respects. It does not mean that boys are more easily fatigued than girls, but rather that

[1] For data on ways of measuring improvement and the significance of the resulting curves see Thorndike, *Educational Psychology*, vol. III, or any standard work on Experimental Psychology. *Cf.* also Chapman, *Psychological Review*, vol. 32, pp. 224–34; and Peterson, *Journal of Experimental Psychology*, vol. 2, pp. 178–224.

[2] By index of fatigue is meant the ratio of the decrease in efficiency (due to continuous work) to efficiency during an initial period of work. Suppose the score was 18 for the first 5 minutes of work and that as a result of the fatigue from three hours' work it was 15 during the last five minutes; then $18-15=3$, the decrease in efficiency due to fatigue; and $3\div18=.167$, or 16.7 per cent, the index of fatigue.

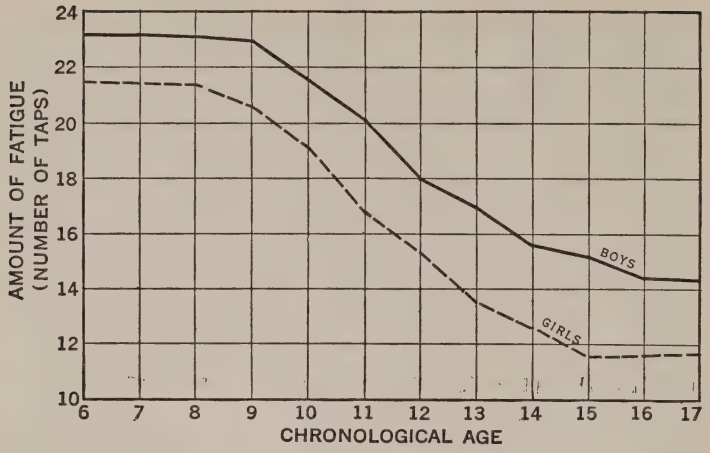

FIG. 22. FATIGUE FROM 45 SECONDS' TAPPING

(Gilbert.)

Curves smoothed. Fatigue measured by difference in number of taps during first 5 secs. and last 5 secs. of 45 secs. practice.

they make higher average speed scores at all ages, and although they lose a little more than the girls, yet at nearly all ages they are more efficient during the final period than are the girls. This interpretation seems to fit the other known facts of sex differences in speed and in fatigue in case of voluntary movement.

PROBLEMS FOR DISCUSSION

1. In what respects are the growth curves of various motor capacities similar? In what respects dissimilar?
2. The development of a complex motor skill during childhood and adolescence.
3. What sex differences do you see in the manual dexterity of adolescent boys and girls? To what extent are they due to training?
4. To what extent does or should the development of motor capacities influence the work in manual training in the sixth grade? In the junior high school? In the senior high school?
5. What is the effect of exercise on the development of muscular

power at ten, fourteen, and eighteen? Upon motor skill at these ages? What sex differences are found?

6. The effect upon maturation of climate; of diet; of race.
7. Secondary sex characteristics of adolescent boys; of adolescent girls.
8. In what ways should the education of adolescent girls differ from that of boys?
9. Muscular fatigue in childhood, adolescence, and adult life.
10. Effect of puberty upon motor skill.
11. The significance of late maturation upon the social development of high-school students.
12. When should typewriting be introduced into secondary schools? Do junior-high-school pupils have the requisite motor development for it? What other factors determine the grade placement of typewriting?
13. The determiners of adult strength.

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CHAPTER IV

MENTAL DEVELOPMENT DURING ADOLESCENCE

1. *Conflicting opinions on adolescent mental growth*

A conflicting array of statements. Much has been written and spoken concerning the supposedly unique features of mental growth during adolescence and pre-adolescence. The teacher, parent, or other student of human nature who reads extensively for specific information on these two periods is confronted by a confusing mass of materials and a conflicting array of statements.

Thus he reads that mental growth between nine and ten is usually greater than that between any two years later on; that the three-year period of childhood preceding pubescence is one in which both mental and physical growth "is slower than at any time until near complete maturity"; that with the onset of puberty "there is a marked acceleration in the development of the whole psychic life"; that the mind develops more rapidly during adolescence than during childhood, and that many new sorts of ideas now make their appearance; that the power to reason increases rapidly during adolescence; that vocabulary seems to be halted in its growth for a year or two at the beginning of adolescence; that during pre-adolescence there is "even a foreshadowing of reason"; that the mental powers and capacities present during adolescence were present earlier; that "differences between adolescence and childhood are more in degree than in kind"; that adolescence means the birth of a new self; that at adolescence comes a sharpening of the senses, and that laboratory experiments show visual and auditory acuity

probably at a maximum at twelve; that "memory for isolated impressions reaches its climax in the early teens"; that at the dawn of adolescence the special sensory memories are numerous; that this is the golden age for motor memories; and that "memories of high ideas, self-sacrifice, and self-forgetfulness are cherished"; that the increase in strength of memory varies from year to year, but that while one kind of memory is increasing rapidly another kind is not; that "growth of memory does not necessarily accompany intellectual development"; that memory reaches its climax at sixteen or seventeen; that "there is no 'memory period,' no period in early school life when the memory is stronger than it is at any later portion of the child's life, a period especially adapted to memorizing"; that the mind at times "grows in leaps and bounds"; that adolescence lasts ten years or more, "during all of which development of every sort is very rapid and constant"; that mental growth during adolescence is regular and at a gradually decreasing rate; that within a few weeks one can often note "conspicuous intellectual changes"; that mental growth ceases about age thirteen or fourteen; that the range of individual differences in all psychic tests increases during adolescence; that the period of greatest variability in mental traits is childhood, not adolescence.

He may also "find" by reading further, that physiological and anatomical ages correlate "strikingly" with mental growth, and have direct bearings on pedagogical age; that anatomical development is not closely related to intellectual and social development; that a new interest arises in the world beyond the immediate surroundings; that there is a rebirth of the imagination; that the adolescent girl, who but almost yesterday was willingly guided and ruled by her parents, suddenly comes to resent "direct commands, wants to know why, rebels," etc., and that "after sixteen there dawns a period when she demands that her teacher shall

know"; that at thirteen she is a dreamer, and at nineteen tries to make her dreams come true.

He reads that during adolescence "love of nature is born," and that the pre-adolescent revels "in all features of nature" such as fields, hills, forests, animals, and especially water.

He may find speculations to the effect that the mind is undoubtedly "pushed and pulled by the old desires and ancient hates of ancestors that many thousand years ago struggled for a higher human life"; that the characteristics of boyhood and girlhood "seem to be those of a relatively ancient stage in racial development."

Confusion from conflicting views necessitates examination of available data. If the student of adolescence reads just a little, his information will vary according to what he selects to read; if he reads widely, he is likely to be confused and either wonder just what is fact and what is fiction in the mass of conflicting materials (samples of which have just been presented), or, accepting as true much that he reads, conclude that adolescents vary so much that this period is one of inherent, inevitable contradictions, and that, as a consequence, the prediction of adolescent behavior is now and must ever be impossible.

That many phases of adolescent behavior cannot now be predicted with the desired accuracy is granted; we do not know enough about it because it has not been studied carefully enough and long enough to yield this sort of knowledge; but the view that adolescence is so variable, that its variation is so irregular, sporadic, eccentric, and erratic that laws governing its changes either do not exist or are so subtle as forever to block the careful, painstaking inquiry of competent students of human nature, is a view that has little to commend it to one's reason.

It is highly important, therefore, that the evidences of

mental development during adolescence and pre-adolescence be presented somewhat in detail, so that the reader may judge for himself what is true and what is assumed. Let us, therefore, examine the available data which throw light on the various phases of this problem.

2. *Sensory and perceptual capacities*

Sensory capacities. First, we consider some of the simpler functions, such as the various sensory capacities. We haven't a large amount of experimental evidence on their development, and what we do have is not derived from retests of the same individuals for several years; but what we have indicates that the various sense organs are almost as sensitive to stimuli by the age of three or four years as they will ever be, although there may be some gradual improvement until the late teens.[1] Evidently, the development of these capacities is largely dependent upon inner factors rather than upon experience, because at any age the limit of improvement from practice is soon reached.

Sensitivity to pain. Pain is regarded as a sensation. Sensitivity to pain, for certain specified areas, has been determined for many individuals of various ages. The method of investigation is, of necessity, subjective. The individual reports when the pressure becomes painful. Since a discussion of the technique of this sort of experiment and of the conditions which yield varying results has no place in this volume, suffice it to say that even under the best circumstances we can never be quite sure, in examining children of various ages, that some element of stoicism has not entered and vitiated the results. Accordingly, too much importance must not be attached to these results; but taken at their face value, they indicate that sensitivity to pain decreases

[1] Risley, *Philadelphia Medical Times*, vol. 11, pp. 673–85; Seashore, *University of Iowa Studies in Psychology*, vol. 2, pp. 55–64.

with age, probably until eighteen or nineteen (see Fig. 23). Girls are more sensitive to pain than boys, the differences becoming greater at the successive ages, and especially at adolescence. Undoubtedly the increased thickness of the

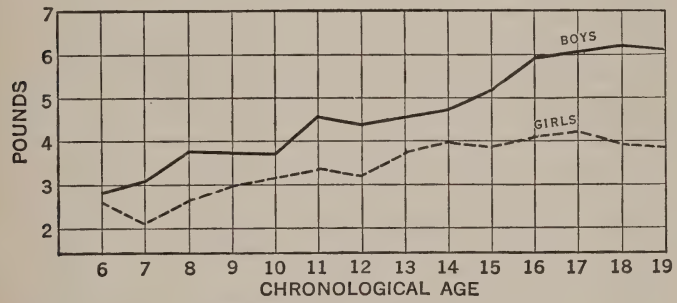

FIG. 23. PAIN THRESHOLD
(Gilbert.)
For approximately 50 boys and 50 girls of each age.

skin as the child grows older has much to do with the decreased sensitivity to pain.

Perception of small differences. Laboratory experiments upon school children and adults indicate that certain, narrow, and relatively simple powers of sensory discrimination do not increase much during adolescence. Perceiving small differences in the weight of objects having the same size and shape seems to be about as effective at fourteen for boys and at thirteen for girls as later, but our meager evidence is not conclusive. Boys are superior to girls at nearly all ages in this form of kinæsthetic perception (see Fig. 24). In the Stanford Revision of the Binet Simon intelligence tests, differentiating weights of three and fifteen grams is placed at the five-year level, indicating that from sixty to seventy-five per cent of unselected five-year-olds can choose the heavier weight; arranging weights of three, six, nine, twelve, and fifteen grams in order from heaviest to lightest is placed at

the nine-year level. Discrimination of this sort probably is somewhat sharper four or five years later, but after the ninth year is not symptomatic enough of mental ability to be of value in estimating intelligence.

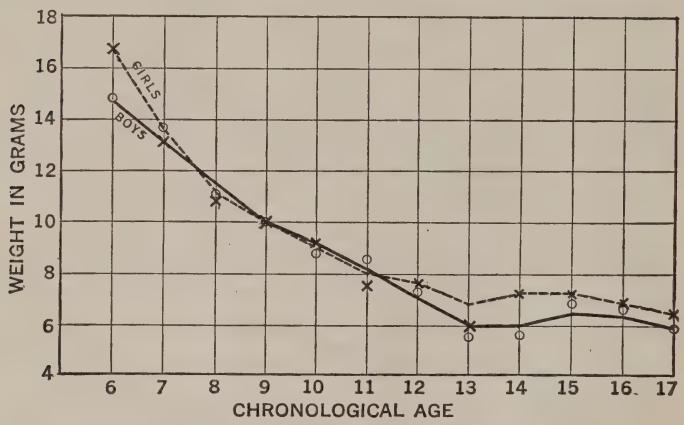

FIG. 24. DISCRIMINATION OF WEIGHT
(Gilbert.)
Curves smoothed. Means shown; x, 0.

The more complex forms of kinæsthetic acuity have not been investigated to determine either their rate of development or the age after which they cease to grow. Nor do we know definitely anything about the comparative improvability by practice of various complex forms of kinæsthetic perception at each age from thirteen to twenty; but what evidence we have seems to indicate that at any age the limit of improvement from practice is soon reached. Little is definitely or conclusively known about the exact ages at which various sensori-motor skills can be acquired most effectively.

The acuity of tactual perception, apart from any special training, seems to decrease from childhood through adoles-

cence to maturity. A stock experiment of the psychological laboratory determines, for certain selected areas, the minimum distances at which two points, simultaneously applied, are perceived as two points instead of one. Thus a limen of sixty-seven mm. on the thigh of an adult may be compared with one of thirty-five mm. on the thigh of a boy of twelve. As would be expected, this sort of tactual discrimination decreases during adolescence. The child, being smaller than the adult, probably has more nerve-endings within a given area of the skin than does the adult, and he has a thinner, more tender skin as well. Practice often has considerable effect upon this function, although its extent is still more or less uncertain.[1]

Ability to perceive differences in pitch of tones and in shades of color [2] probably increases some during adolescence, but not very much (see Fig. 25). In the six years preceding the teens the increase in color discrimination is likely to be many times greater than that occurring during the teens.

In general, it seems that such narrow functions as the various sorts of sensitivities and sensory discriminations are almost fully developed by the time of puberty, or else continue to decrease as in case of the pain threshold. The experimental evidence gives no ground for believing that at adolescence a new dermal consciousness arises, or that the sensory capacities are greatly renewed.

Sensori-motor functions. The winking which follows the sudden near approach of an object to the eye is a reflex, and is involuntary; but by practice it can be brought under

[1] Dresslar, *American Journal of Psychology*, vol. 6, pp. 313–68, reports a case in which the initial limen of 29 mm. was reduced to 21 mm. the first week, to 10 mm. the second, to 5.5 mm. the third, and to 2.8 mm. the fourth week; but some investigators have found but little improvement from practice.

[2] *Studies from Yale Psychological Laboratory*, vol. 2, p. 58; *University of Iowa Studies in Psychology*, vol. 2, p. 61.

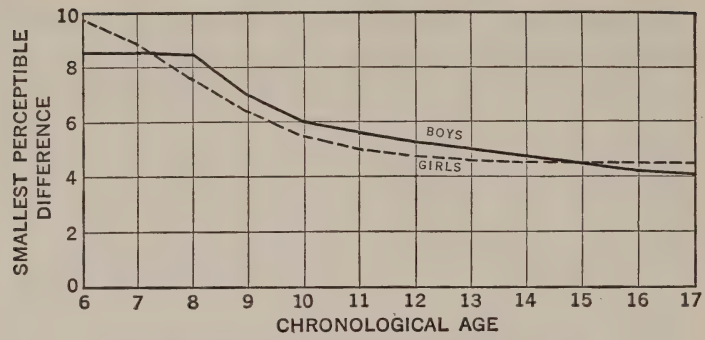

FIG. 25. DISCRIMINATION OF TEN SHADES OF RED

(Gilbert.)

Number of cases, approximately fifty of each age and sex. Curves smoothed. At ages six, seven, and eight, approximately fifty per cent of the children were unable to discriminate any of the shades, saying that all ten of them looked exactly alike.

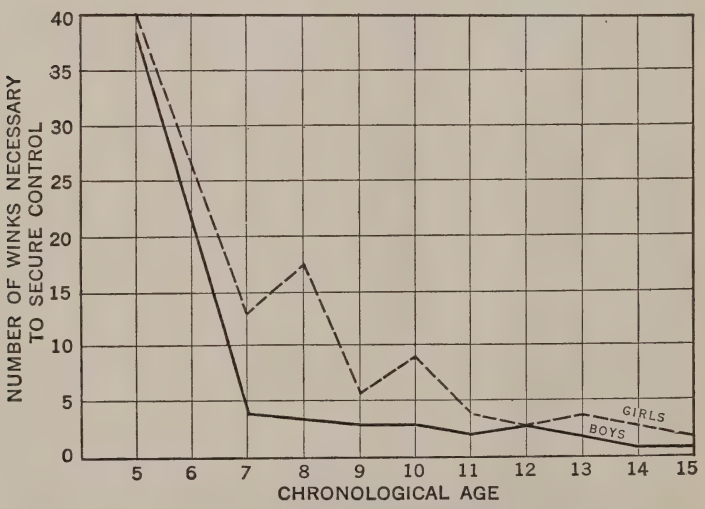

FIG. 26. AMOUNT OF PRACTICE TO CONTROL THE REFLEX WINK

584 boys; 557 girls.

(Partridge.)

voluntary control. Experiment [1] has shown that older children require less practice than younger children in order to inhibit it, although the power of inhibition is almost as fully developed by seven or eight as at fifteen (see Fig. 26). The amount of improvement during adolescence is relatively small indeed.

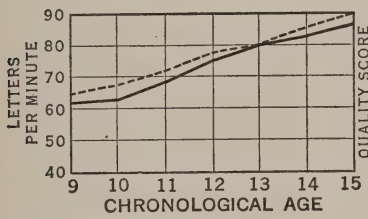

FIG. 27. DEVELOPMENT OF A SENSORI-MOTOR FUNCTION
(Speed of handwriting.) Determined by retests.
(Brooks.)

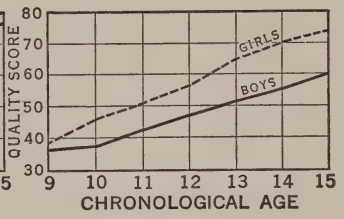

FIG. 28. DEVELOPMENT OF A SENSORI-MOTOR FUNCTION
(Quality of handwriting, Ayres scale.) Determined by retests.
(Brooks.)

In such a function as handwriting, skill increases well on into adolescence, although environment or training exerts great influence upon the course of development. Both speed and quality are known to increase, on the average, until fifteen or later (see Figs. 27 and 28); in fact, the slopes of the curves in Figs. 27 and 28 do not indicate any immediate cessation of increase in speed or quality, although different training up to the beginning of adolescence or throughout the teens would show growth-curves differing from those we have presented.

3. *Attention*

Power of sustained attention. The power of sustained attention undoubtedly is greater at the close of adolescence than at the beginning. Keeping the attention upon an ob-

[1] Partridge, *American Journal of Psychology*, vol. 11, pp. 244–50.

ject involves several factors, three of which are as follows: (1) the individual's mental set, attitude, or purpose, however induced or conditioned; (2) any emotional instability or disturbance which may cause a fluctuation of attention; and (3) an intellectual factor, such as seeing many qualities, characteristics, and relations in the object to which one attends.

We used to hear illustrations of the power of sustained attention in which some "gifted" individual could keep his mind fixed for a long time upon some relatively simple object or narrow situation: e.g., the man who, seeing the head of a nail in the floor, could keep his attention upon it for a half hour or longer. If the man really did keep "head of the nail" in his consciousness all that time, we may be reasonably certain that he was not merely conscious of "head of the nail, head of the nail," over and over all the time. While it is possible for an individual to do such an inane thing, few people, besides some students and teachers of psychology, for example, or eager pursuers of a learn-concentration-quickly course, are likely ever to do so. Even then, the majority of those attempting such a task would be likely, after a few minutes, to find themselves merely saying the words to themselves in a more or less mechanical fashion which required little attention to keep it going; for the most part, they would occupy themselves largely with other things. The man who, for illustrative purposes, so accommodatingly focused his attention upon the convenient nail in the floor, undoubtedly thought of or was conscious of a great many things which, strictly speaking, were not merely "head of the nail," as any one can discover by trying the experiment himself.

Apparently, then, concentrating attention upon an object involves seeing many things in it. This factor in turn depends upon certain constituent elements, one of which is age.

The older child has a wider range of experiences, has a greater store of meanings than he had when younger, so that any object to which he attends is likely to be richer in meanings and associations. The older child normally has greater general mental ability (see Chapter V) and more effective habits of mental control than he had previously. Even the beginning of puberty may not necessarily break seriously the individual's progress in the control of his emotions in the service of his total, integrated behavior (see Chapter VIII).

Experimental evidence on the development of the power of sustained attention is not extensive, and often concerns rather narrow mental functions, but it supports our view just expressed — that the youth at eighteen can keep his attention upon an object longer and probably more intensely than he could at fourteen or at ten. (See Fig. 29.)

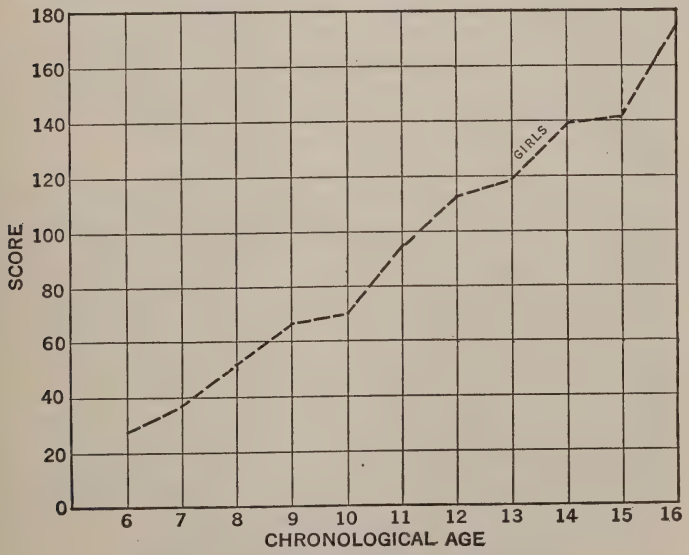

FIG. 29. SUSTAINED VOLUNTARY ATTENTION
(Bickersteth.)
Approximately 500 girls were tested.

It is generally recognized, however, and close observation indicates, that the youth of sixteen or eighteen is not likely to be as docile or amenable to control by his elders as the eight-year-old or the child of ten; that, as a consequence, he may not be as willing to coöperate in keeping his attention upon things specified by others. He may, therefore, at times seem to have less power of sustained attention than he had at an earlier age, whereas he really has more, but we have not been able to secure that right rapport which is essential to evoke it for the particular task in hand. Maximum development is reached probably at different ages by different individuals.

Divided attention. The ability to divide the attention among two or more activities involves a certain degree of mental alertness and control. Older children seem able to do this better than younger ones (see Fig. 30).

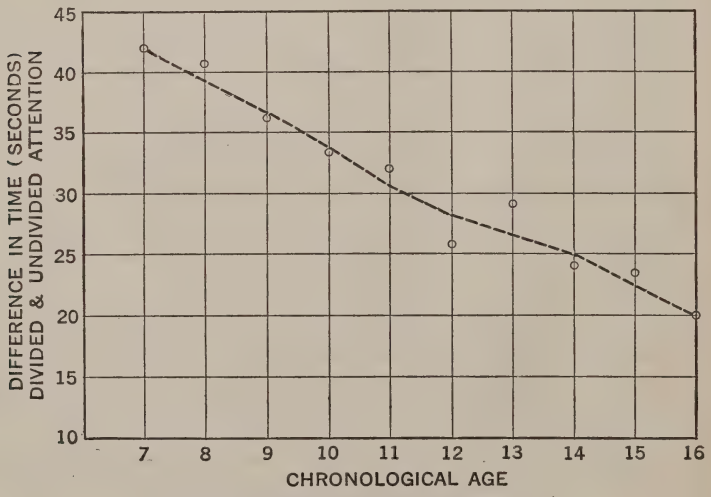

FIG. 30. EFFECT OF DIVIDED ATTENTION
(Bickersteth.)
In the case of girls. Curves smoothed.

Other forms of attention. Nearly all tests used to measure mental and motor capacities also measure some aspect of attention. A survey of the results of many investigations relating to children of various chronological ages indicates that speed of discriminative selection or observation, measured by the familiar cancellation test (see Fig. 31), and various

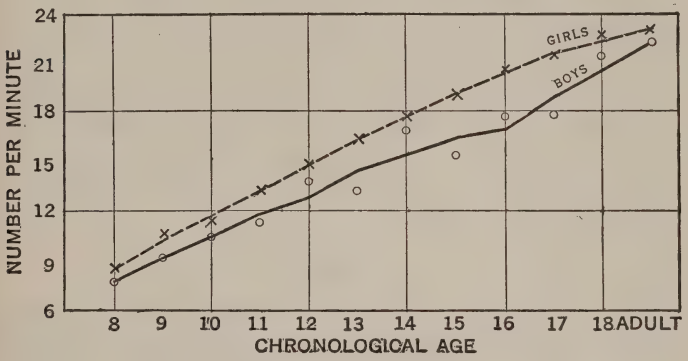

FIG. 31. SPEED OF DISCRIMINATIVE SELECTION — CANCELLATION
(Pyle, 1913.)
N = 1251. Curves smoothed.

forms of analytic and synthetic apperception increase until the late teens; and that the range of attention as measured by the number of objects perceived in a very short interval of time does not increase much during adolescence unless there is offered some possibility of grouping or combining.[1]

4. *Theoretical curves of growth, and of rate of growth*

Growth, and rate of growth. Two things must be clearly differentiated in discussing the growth of mental capacities; (1) their efficiency or status at each of the ages under consideration, and (2) the rate at which they grow from year to year. A capacity may increase each year so that the indi-

[1] Freeman, *Psychological Bulletin*, vol. 8, pp. 43–44.

vidual has more of it at each age than ever before, while the rate of growth itself may be either (*a*) increasing, (*b*) remaining constant, or (*c*) decreasing. Figs. 32, 34, and 36 show theoretical growth curves in which the rates of growth from one age to the next (*a*) increase, (*b*) remain constant, and (*c*) decrease, respectively. Figs. 33, 35, and 37 show the corresponding curves of rate. Rates of growth may readily be found by subtracting from the score at each age the score of the age immediately preceding, or they may be determined directly, as illustrated in Figs. 32, 34, and 36, by drawing the lines 12*a*, 13*b*, 14*c*, etc., and drawing the dotted lines *aa'*, *bb'*, *cc'*, etc. Then *a'b*, *b'c*, *c'd*, etc., are the rates of increase or growth which are plotted in the rate curves, Figs. 33, 35, and 37.

5. *Memory*

The ability to memorize usually increases during adolescence — at least until the late teens. Generally, the youth at sixteen can memorize various sorts of materials more efficiently than he could at some earlier age, and he probably will be capable of doing so even more effectively at eighteen, if the interest and the effort factors be kept constant. The belief, that during the early school years the child's memory powers are greater than they will be later, has no more supporting evidence than the equally fallacious notion that with the coming of adolescence reason is born. As a matter of fact, the evidence unmistakably indicates that the various sorts of memory do increase during adolescence, probably until eighteen or later.

Rote memory. Memory for isolated impressions, for digits, for series of words, for foreign words and their vernacular equivalents, and for similar sorts of materials undoubtedly grows until eighteen or longer for many individuals (see Fig. 38). Investigation is needed to deter-

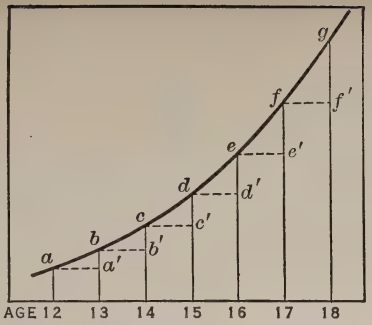

FIG. 32. THEORETICAL GROWTH CURVE, POSITIVE ACCELERATION

Growth each year is 1.25 that of the preceding year.

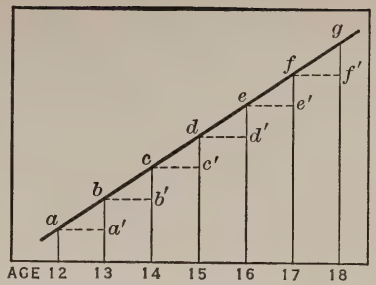

FIG. 34. THEORETICAL GROWTH CURVE, ZERO ACCELERATION

Growth each year is the same as that the preceding year.

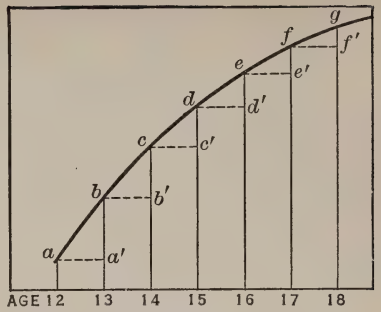

FIG. 36. THEORETICAL GROWTH CURVE, NEGATIVE ACCELERATION

The growth each year is .8 that of the preceding year.

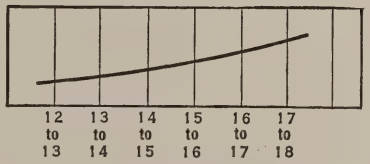

FIG. 33. INCREASING RATE OF GROWTH

Shown by theoretical curve of Fig. 32.

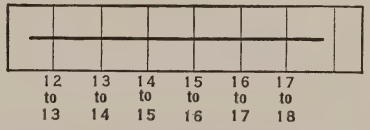

FIG. 35. CONSTANT RATE OF GROWTH

Shown by the theoretical curve of Fig. 34.

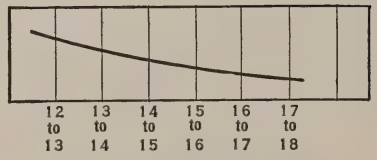

FIG. 37. DECREASING RATE OF GROWTH

Shown by the theoretical curve of Fig. 36.

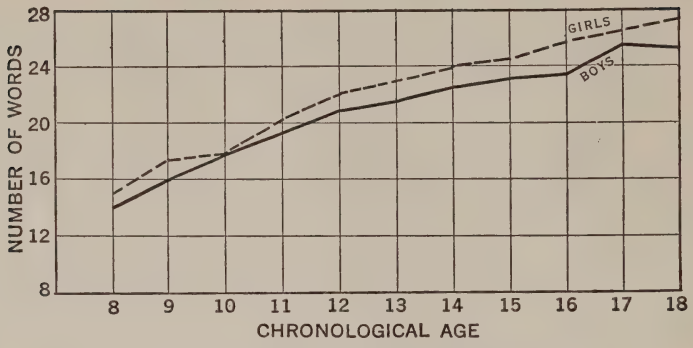

FIG. 38. ROTE MEMORY, ABSTRACT WORDS
(Pyle.)
In the case of 3637 boys and 3854 girls.

mine when this ability reaches its maximum among individuals at the various levels of intelligence.

Logical memory. The more complex forms of memory, such as logical memory, are important because they function so often in learning and organizing many complicated facts, principles, and processes. The development of this sort of memory is closely related to or dependent upon the development of such other complex mental functions as reason-

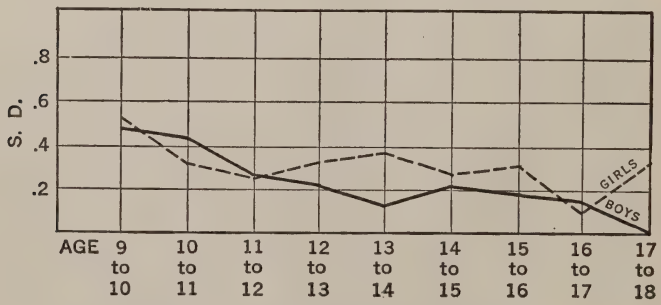

FIG. 39. RATE OF GROWTH OF MEMORY
(Brooks, 1921.)
For 9119 boys, and 9225 girls.

ing and the ability to see analogies, to select opposites for certain words, or to perceive and understand other abstract relations. The evidence indicates that the developmental history of these memory functions is not essentially different from that of the simpler forms.

Reference to the growth curves of memory reveals a characteristic retardation in the rate of increase during adolescence, indicating that while the child gains in memory power until the late teens, he gains at a decreasing rate (see Fig. 39).

6. *Judgment and reason*

According to popular belief, judgment and reason develop most rapidly during adolescence. Occasionally the two or three years preceding puberty are said to show some foreshadowing of reason, but the development of reason itself is often regarded as a function of the adolescent years. Of course, the capacities of forming judgments and of reasoning do develop during adolescence; of this we are sure, since observation and experiment both indicate it. Forming judgments involves that "comparison and discrimination by which knowledge of the values and relations of things is mentally formulated or asserted."

Meaning of reasoning. Reasoning has been defined as any use of knowledge in a new way. In a novel situation the mere recall or repetition of previously acquired reactions is not an adequate response. The situation by its novelty becomes a problem. The individual may be familiar with many elements of it, but not with them as they are now combined. Reasoning is the process: (*a*) of analyzing the novel or complex situation into its constituent elements so they may be examined carefully to perceive their nature and significance, (*b*) of recalling and selecting the elements that are significant for the problem in hand, and (*c*) of

manipulating or combining them so as to solve the problem or meet the demands of the situation.

Reasoning involves selective thinking — is, in fact, not at all different from reflective thinking.[1] An essential process is inference. After analyzing available data on the problem situation and seeing the significance of the various elements involved — how they are related to the matter in hand — the individual makes an inference or comes to a conclusion; he responds to the novel or complex situation by a more or less subtle use of his knowledge or experience. Thus experiment has shown that many human beings, in solving mechanical puzzles, often proceed by a trial-and-error method which involves a great deal of sporadic, hit-or-miss manipulation — a procedure in which reasoning is used very little or not at all. On the other hand, some persons, confronted by the same novel complex situation, devote much attention to a careful piecemeal examination of the puzzle so as to discover any clues to its solution from the size, number, and relations of its various parts, recalling the while any previous experiences that seem pertinent and trying them out mentally on the problem. Promising clues are followed up ideationally or by actual motor try-out. Motor manipulation of the hit-or-miss variety tends to be a minimum, after possibly a few initial trials to grasp a general idea of the nature of the puzzle; analytic and selective thinking tends toward the maximum; the two processes occurring, however, in varying intermediate proportions depending upon the individuals who are trying to solve the puzzles.

Likewise, in solving problems in mathematics, business, medicine, equity, etc., we find the individual breaking the total unwieldy situation into smaller ponderable wholes, and selecting and arranging these and other recalled elements

[1] On judgment, reflective thinking, and reasoning, see chapters 6–8 in Dewey, *How We Think*, or consult any good textbook on Psychology.

to form the new pattern required by the problem at hand.

Reason present before puberty. Manifestly, then, we cannot accept the view that reason begins at adolescence, or even that it is merely foreshadowed during pre-pubescence. Little evidence, either from observation or experiment, is found to support the belief that the various mental capacities appear in the individual in a serial order according to some time sequence — a view held by some earlier psychologists and by many teachers. Could we but secure a cross-section of a child's mind at any instant, we would find many mental processes present even at an early age. Perception — the consciousness of an object present to sense — is often but one short step removed from judgment, interpretation, or classification. Even though the psychologist thinks of these activities as sensation, perception, memory, judgment, reasoning, imagination, etc., and analyzes and describes each in turn, he does it merely to center his attention upon each phase of mental activity so that he may study it more carefully. His serial treatment does not imply that these functions appear one after the other and with considerable intervals of time between the successive members of the series.

The evidence clearly indicates the dawn of reason long, long before puberty. For example, the little tot of two, pulling the hairs on his father's wrist, was reproved by his father, who said, "Don't, Donald, it hurts daddy"; to this the little fellow replied, "It didn't hurt grandpa." Childish reasoning it was, to be sure, as was also that of the little girl of three who planted a dime, telling her mother they would now have lots of ten cents. Both were wrong; their applications of previous experiences to the two situations were inadequate, and revealed incomplete understanding of the difference between fathers and grandfathers in good nature and patient long-suffering, and of the phenomena of germination and growth. Still, we cannot set up *correct* application or use of

knowledge as the *sine qua non* of reasoning — witness the responses of high-school and college students to complex mathematical, linguistic, or other problems, to say nothing of the blunders of statecraft, the mistakes of medicine, or the many, many unsolved or wrongly solved problems of the adult world.

Similarly, children early form judgments, sometimes very simple ones, and more or less concrete, but by the age of three or four their judgments sometimes partake of the nature of generalization, as in the case of the little girl of three and one half years who said to her father, who had hurt his hand at some work, "Little girls' daddies shouldn't hurt themselves, because little girls love their daddies"; or, of the boy of nine who, in defining some words, said, "When you can't define it, you tell what it does."

Reasoning partly dependent upon past experiences. Effective reasoning implies that significant features of past experiences have been apprehended. A wide range of experiences should then, other things being equal, lead to more effective thinking. Given a reasonably diverse stimulating environment, such as that surrounding children in modern civilized communities, and we would expect age or the maturity indicated by age to be marked by the growth of the capacity to reason. Of course, inner growth is making its contribution, although we do not know (and, in the present state of development of our knowledge and of the tools by which we can add to our knowledge, we probably cannot know precisely) the exact contributions of either nature or nurture.

Development of reason before and during adolescence. Experimental investigation gives support to wide observation. If we arrange a series of suitable tasks in order of difficulty, and give the test to a group of eight-year-olds; if we retest the same group a year later with another set of

tasks of the same difficulty, and continue this retesting year after year, allowing for the improvement that comes from practice in taking the tests; or, if we test large numbers of typical children at each age from eight to eighteen, we find that the eight-, nine-, and ten-year-olds make a very creditable showing in comparison with those a little older. They do not make as high scores. They cannot reason as effectively as the older children, especially in dealing critically with complex abstractions. Their power to reason has been, still is, and for several years will continue developing. If we had a highly reliable, thoroughly valid, broad and comprehensive test of reasoning abilities, with the test items ranging by equal steps from zero difficulty to the difficulty that would challenge the ability of the upper half of college freshmen, we would find the typical child of eight far from the zero end of such a scale.

To pass the ball-and-field test of the Stanford-Binet intelligence tests, at the eight-year level, the child must be able not only to comprehend the nature of the problem, but also to show some plan, even though it be an inferior one; at twelve he must show a plan well-adapted to solving the problem. Approximately two thirds of the children eight years old can answer satisfactorily such questions as the following: [1]

What is the thing for you to do:

(*a*) When you have broken something which belongs to somebody else?

(*b*) When you are on your way to school and notice that you are in danger of being late?

(*c*) If a playmate hits you without meaning to do it?

At ten the normal child can analyze such situations as the following, and detect the absurdities: [2]

[1] Terman, *The Measurement of Intelligence*, pp. 215 ff.

[2] Terman, *op. cit.*, pp. 255 ff.

(*a*) A man said: "I know a road from my house to the city which is down hill all the way to the city and down hill all the way back home."

(*b*) An engineer said that the more cars he had on his train the faster he could go.

(*c*) Yesterday the police found the body of a girl cut into eighteen pieces. They believe that she killed herself.

In Fig. 40 are shown the results of a typical investigation bearing on the development of reason during adolescence. Other data are derived from parts of the tests used to measure general intelligence; and so we have left them for consideration in Chapter V.

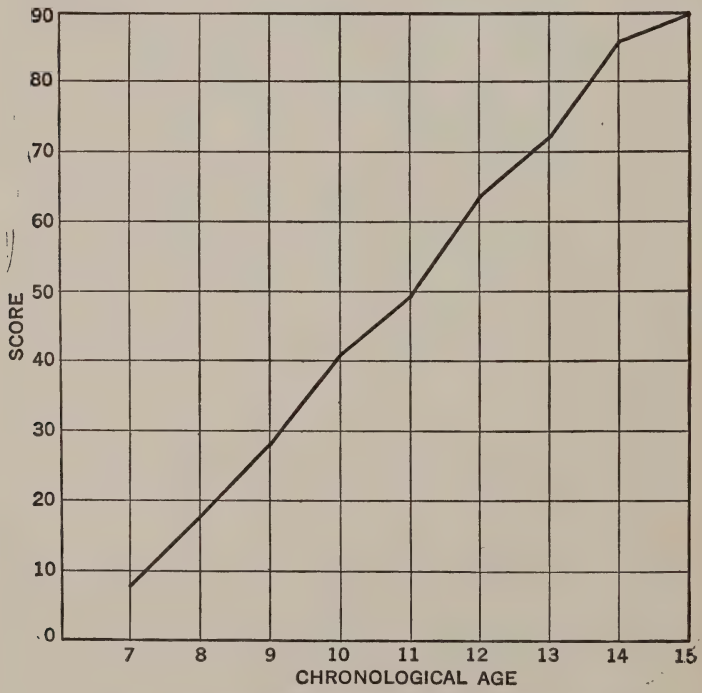

FIG. 40. GROWTH CURVE OF ARITHMETICAL REASONING
(Kelley-Ruch-Terman.)
N = 1540.

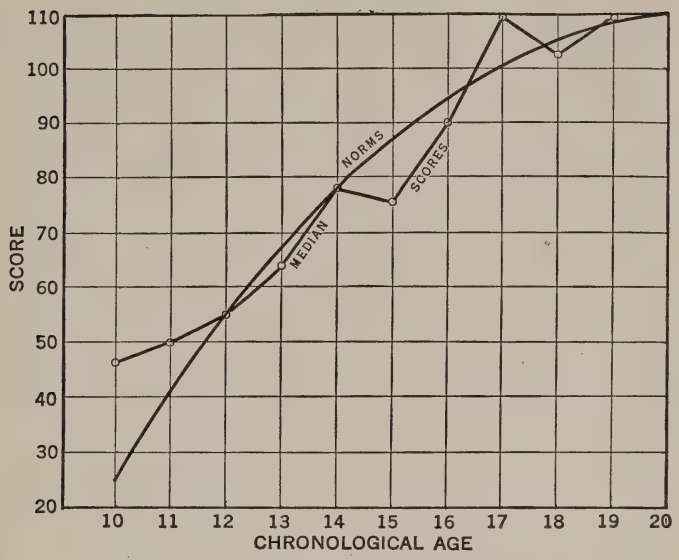

FIG. 41. READING GROWTH CURVES

(On Haggerty Silent Reading Test, Sigma 3.) Median Scores of 6290 boys and girls in New York State.

7. *The development of reading abilities*

Silent reading. We can secure important clues to the growth of certain mental functions for part of the adolescent population by noting the course of improvement in the capacities which are measured by achievement tests in the various school subjects. For the sake of brevity we consider data from but one subject — reading. Ability to read, as measured by such tests as the Thorndike-McCall, the Haggerty Sigma 3 (see Fig. 41), and the Stanford Reading Tests involves certain complex mental functions, the most important of which for our present purpose is selective thinking or reasoning.[1] Under good school conditions

[1] See Thorndike on "Reading as Reasoning," in *Journal of Educational Psychology*, vol. 8, pp. 323–32.

children usually develop throughout their high-school course in the ability to grasp the meaning of sentences and paragraphs by reading them silently, but the most rapid increase comes in the elementary school. Of course, high-school students as a group are superior in intellectual ability to the general population of the same ages whose development in ability to read is unknown.

Vocabulary. Vocabulary also increases during adolescence, at least until the age of sixteen, and probably beyond that age. According to the Stanford-Binet tests of intelligence, word knowledge is assumed to increase until the age of sixteen for general population. Terman's estimates for certain years are as follows:

Age	Number of Words
10	5,400
12	7,200
14	9,000
16	11,700

8. *Other mental functions*

Other mental capacities develop until middle or later adolescence, as shown by various sorts of psychological and educational tests: e.g., naming the opposites of the words in a carefully graded list; the speed of a relatively simple sort of learning, measured by the familiar substitution tests in which letters are substituted for digits, digits for letters, or other characters for various symbols, according to a given key; the free association of ideas which, according to Terman,[1] depends chiefly upon, (1) the "richness and variety of previously made associations with common words, and (2) the readiness of these associations to reinstate themselves"; verbal ingenuity, as measured by the number of words formed in a given time from a specified list of six letters; the

[1] *Measurement of Intelligence*, p. 274.

completion of increasingly difficult sentences from which certain words have been omitted; and following directions which have been arranged in a series of graduated difficulty. While retest data are relatively meager, yet the results are in general agreement, indicating development until the age of seventeen or later in the important mental abilities fundamental to success with such tasks as those just noted. (See Figs. 42 to 45.)

9. *Conclusions*

In the first pages of this chapter we presented a wide variety of conflicting views on adolescent development, many of them relating to particular mental functions. We have also presented evidence indicating the probable developmental history of many mental capacities, setting forth the data in such detail as risks sacrificing the interest of not a few readers. In selecting the evidence, we have sought that which is valid and reliable, as well as that which is a comprehensive, typical sample of the whole. By comparing this evidence with the first two pages of the chapter the reader can judge for himself what is probably true and what is probably false in these conflicting statements.[1]

Perhaps some readers will be disappointed to find the development of these various mental abilities so devoid of the bizarre and the irregular that it seems quite prosaic and humdrum. We can find little sound evidence, however, showing that any of these specific capacities are subject to sudden changes in rate of growth; or indeed, as we shall see in Chapter XIV, that the development of one of them is generally at the expense of some other; i.e., accompanied by a loss or decrease in some other, as the doctrine of compensation really implies. Of course, it is possible that retests at

[1] To evaluate conflicting statements on personality compare them with the data in the later chapters on Adolescent Personality.

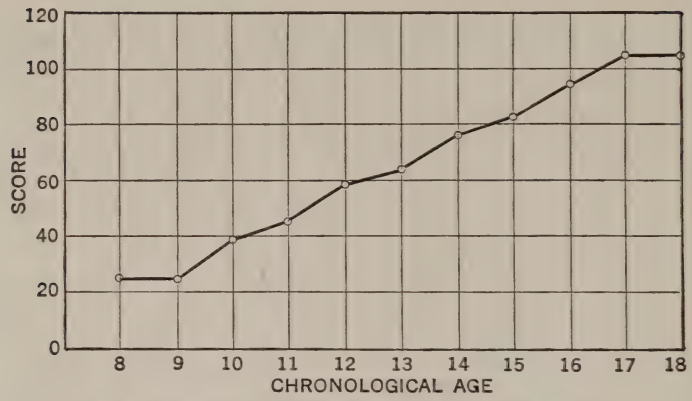

FIG. 42. MEDIAN SCORES ON WYLIE OPPOSITES TESTS

Tests of 11,785 pupils in Grades III to XII of the Des Moines, Iowa, Public Schools. (Calculated from Table 48, page 76, Wylie, 1925.) At age eighteen many pupils of superior ability have graduated from high school; consequently the eighteen-year-olds tested are not strictly comparable with the fifteen-, sixteen-, and seventeen-year-olds.

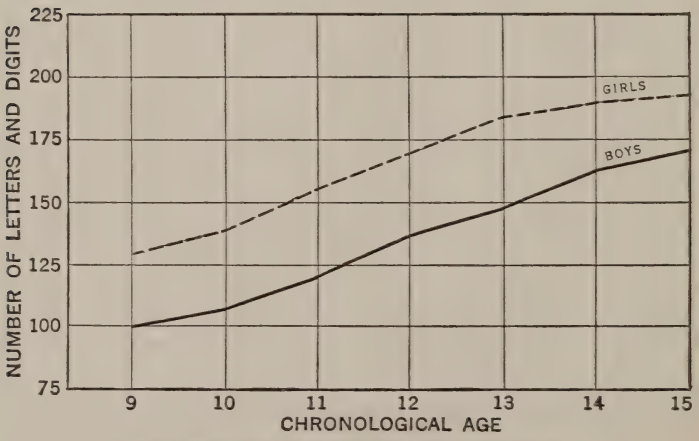

FIG. 43. SPEED OF LEARNING (SUBSTITUTION)

(Brooks.)

Ages nine to fifteen.

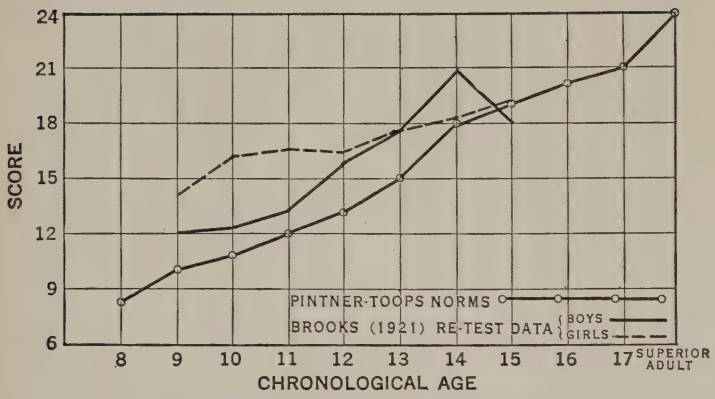

FIG. 44. ABILITY TO FOLLOW DIRECTIONS

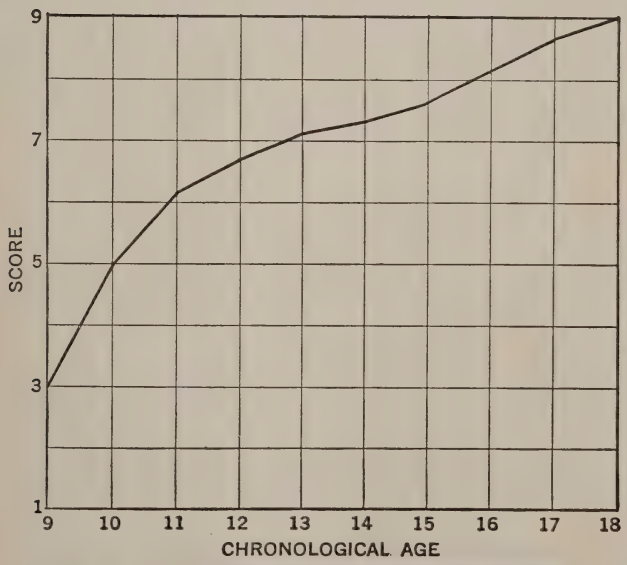

FIG. 45. GROWTH CURVE FOR LANGUAGE COMPLETION

(Kelley-Trabue.) Taken from norms for Alpha and Beta completion exercises derived from school populations.

intervals of two, three, four, or six months might show sudden changes in rate or some compensatory development, but it is not probable. Annual retests do not show either.

Many mental traits or capacities seem normally to develop fairly regularly from long before the teens until the seventeenth or eighteenth year, or longer: for example, reason, memory, judgment, and attention. Certain simple sensory powers, such as discrimination of weights, estimating short intervals of time, and the like, seem to reach a maximum by twelve or fourteen; others, as visual and auditory acuity, probably increase little or not at all during adolescence; while additional ones, such as pain sensation and certain aspects of tactual perception, actually decrease during the teens. Undoubtedly individuals differ in the rate of development and in the time at which the various functions cease to develop. Further research by the retest method is needed at ages sixteen to twenty or twenty-four, with materials and under conditions adapted to securing reliable, valid information on mental development during these years.

PROBLEMS FOR DISCUSSION

1. What are the differences between the reasoning of children and that of adolescents? In what respects is the reasoning of adolescents different from that of adults? What factors account for any differences?
2. Critically examine the statements on adolescent mental growth given in the first few pages of this chapter. Divide them into five groups — those undoubtedly true, those probably true, those probably false, those undoubtedly false, and those whose truth or falsity has yet to be determined by careful investigation.
3. What is the effect of environment or training upon the time when a child's power to reason, memorize, or form judgments ceases to develop?

4. What factors determine when a sensori-motor function like handwriting will cease developing?
5. The neural basis of mental development.
6. Discuss: Reading ability develops until the end of the senior year of the secondary school.
7. The development during adolescence of other kinds of reasoning besides arithmetical.
8. The place or function of memory in the power of reasoning.
9. What effect does the organization (or association) of ideas have upon memory?
10. Differences in mental fatigue during childhood, adolescence, and adult life, and their causes.

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CHAPTER V

THE GROWTH OF INTELLIGENCE

HAVING discussed the adolescent and pre-adolescent development of many specific traits and capacities as measured by existing psychological and educational tests, we now turn our attention to several important problems of the growth of intelligence, such as the rate of growth, the variability of individual performance and the constancy of the I.Q., the nature of mental growth after the age of fifteen, the age of cessation of growth, and the mental age of adults. Let us first, however, note what is meant by intelligence and what kinds may be distinguished.

1. *The meaning of intelligence*

For an adequate discussion of this topic the reader is referred to the extensive literature on the subject.[1] We give only the briefest account of some current psychological opinions.

Definitions. According to a widely accepted popular notion, intelligence is defined as the capacity to learn. This conception is useful for many purposes, but close examination soon reveals its inadequacy, especially since tests of ability to learn have not thus far proven their superiority to other tests in measuring intelligence as defined by the best

[1] Consult such references as the following: Binet and Simon, "L'intelligence des Imbéciles"; *L'année Psychologique*, vol. 15, pp. 1–147; Dearborn, *Intelligence Tests*; Peterson, *Early Conceptions and Tests of Intelligence*; Pintner, *Intelligence Testing*; Spearman, *The Nature of Intelligence and the Principles of Cognition*; Terman, *The Measurement of Intelligence*; Thorndike, *The Measurement of Intelligence*; and Thurstone, *The Nature of Intelligence.*

criterion we can build up. Binet says,[1] "Comprehension, invention, direction, and criticism — intelligence is contained in these four words," and he contrasts the intelligence of the normal child with that of the adult, showing that the former is deviating, inconstant, and capricious, as compared with the adult, in the direction of his activities; that his comprehension is superficial, his power of invention more limited, and that in respect to auto-criticism, "he judges poorly the accuracy of what he says and does," and is more likely to be satisfied by superficial or absurd reasons. According to Stern, intelligence is "the general capacity of an individual consciously to adjust his thinking . . . to new problems and conditions of life." For Ebbinghaus, intellectual ability consists in "the elaboration of a whole into its value and meaning by a many-sided combination, correction, and completion of numerous kindred associations."

In a symposium on the nature and measurement of intelligence a few years ago certain American psychologists expressed their views as follows:[2]

Colvin: "An individual possesses intelligence in so far as he has learned, or can learn to adjust himself to his environment."

Haggerty: "A group of complex mental processes traditionally defined in systematic psychologies as sensation, perception, associations, memory, imagination, discrimination, judgment, and reasoning," excluding "emotions, instincts, will-activities, and so-called character traits."

Terman: "An individual is intelligent in proportion as he is able to carry on abstract thinking."

Thurstone: "Intelligence as judged by everyday life contains at least three . . . components: (*a*) the capacity to inhibit an instinctive adjustment; (*b*) the capacity to re-define the inhibited instinctive adjustment in the light of imaginally experienced trial and

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[1] *Les idées modernes sur les enfants*, p. 118.

[2] *Journal of Educational Psychology*, vol. 12, pp. 123–47, 195–216, 271–75.

error; and (*c*) the volitional capacity to realize the modified instinctive adjustment into overt behavior to the advantage of the individual as a social animal."

More recently (1927) Thorndike in his volume, *The Measurement of Intelligence*, says (p. 22):

> Any system of units of measurement that is to be adequate must then apparently be flexible enough to apply to a wide variety of operations such as we may call attention, retention, recall, recognition, selective and relational thinking, abstraction, generalization, organization, inductive and deductive reasoning, together with learning and knowledge in general.

He also sets up three criteria for determining intelligence — (*a*) altitude or level, (*b*) extent or area, and (*c*) speed; stating that, "other things being equal," (*a*) "the harder the tasks," or (*b*) "the greater the number of tasks of equal difficulty that a person masters," or (*c*) "the more quickly" he "produces the correct response, the greater is his intelligence."

On the relative value of these three aspects of intelligence he says (p. 35):

> From the economic and philanthropic points of view, altitude is enormously more important. If an intellect could be hired from Mars of so high a level that it could learn how to prevent war as easily as Jenner learned how to prevent smallpox, a million dollars a day would be a cheap wage for the earth to pay him.

2. *Kinds of intelligence*

Three kinds of intelligence. Three kinds of intelligence are often distinguished: — (*a*) intellectual, or the ability to deal with ideas and symbols; (*b*) mechanical, or the ability to deal with material objects present to sense; and (*c*) social, or the ability to respond effectively to other human beings. Artistic intelligence is sometimes regarded as a fourth kind, although, so far as we have been able to discover, there is no

experimental evidence showing such an interrelationship of the various abilities included as would be expected if they really did constitute one sort of general intelligence.

The importance of social intelligence, of the ability to deal effectively with human beings — the sort of ability possessed by the highly competent executive, administrator, or sales manager — is generally recognized, although often designated by other names. Its essential constituent elements, however, have not been isolated, except in so far as they may be included in some of the analyses of personality traits; neither do we have any adequate instrument for measuring them with even a fair degree of accuracy and reliability. Accordingly, any vague generalizations or platitudes about the development of social intelligence are worthless, and the true story of its growth before and during adolescence must yet remain unwritten.[1]

Some information is available on mechanical intelligence or mechanical aptitude, but it is meager in amount.[2] On the growth of intellect, we have a great mass of evidence, but, even in this case, adequate information is lacking on many important questions. Let us consider first the growth of intellect, or, as many would prefer to call it, the growth of intelligence.

3. *Growth curves of intellect*

Growth curves from norms of group intelligence tests. As a first approach to the problem of the growth of intelligence during adolescence and pre-adolescence, we may note the curves derived from plotting the age-norms of a few

[1] For an account of a test designed to measure social intelligence, see Moss and Hunt, "Are you Socially Intelligent?" in *Scientific American*, vol. 137, pp. 108–10.

[2] See, for example, MacQuarrie, "A Mechanical Aptitude Test"; in *Journal of Personnel Research*, vol. 6, pp. 329–37; and Stenquist, *Measurements of Mechanical Ability*.

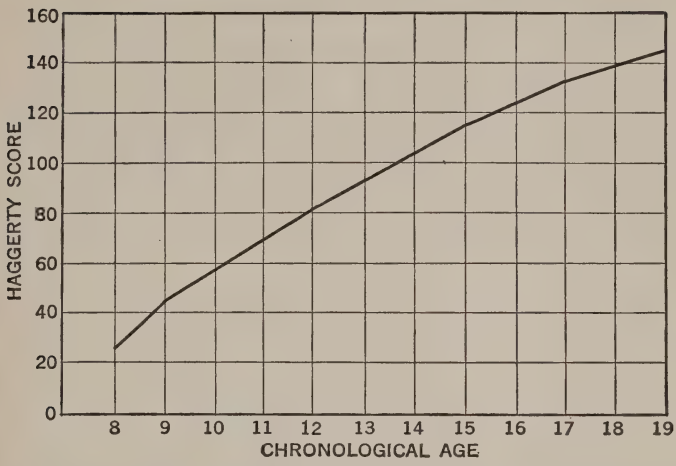

FIG. 46. MENTAL GROWTH CURVE, AGES EIGHT TO NINETEEN

Based upon the norms of the Haggerty Group Intelligence Examination, Delta 2, for nearly 40,000 cases.

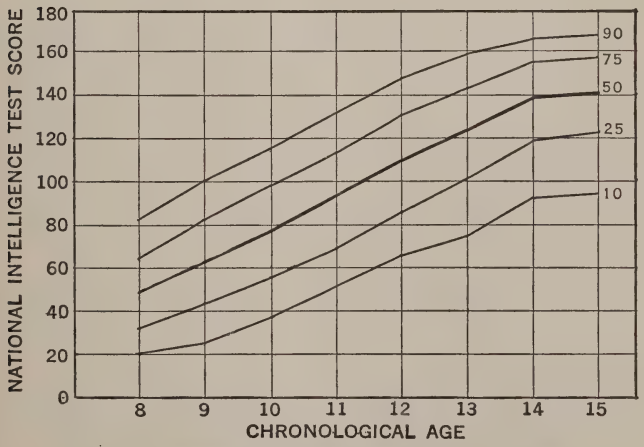

FIG. 47. PERCENTILE SCORES, AGES EIGHT TO FIFTEEN

On the National Intelligence Tests, Scale A. Based upon more than 35,000 cases.

group intelligence tests which have been given to several thousand teen-age boys and girls. (See Figs. 46, 47, and 55, as well as Figs. 38 to 45 of Chapter IV.) The Haggerty norms indicate a decrease in rate of mental growth throughout adolescence, the curve being flattened somewhat at the later ages. In fact, the entire curve shows negative acceleration. The curve from the National A norms is a straight line from eight to fourteen, with a distinct flattening after that age.

While the general shape of the Otis growth curve is slightly convex, yet from eight to sixteen it is almost a straight line, with two slight breaks at ten and twelve, and a marked flattening after the age of sixteen.

Growth curves of various mental functions. The growth curves in Chapter IV may be divided roughly into two groups, according to their form: (1) those very nearly a straight line, and (2) those somewhat convex, shaped like so many of the practice or learning curves found in psychological experiments, with greater earlier gains.

To infer, however, the typical form of the mental growth curve from curves such as these may be largely a gratuitous procedure, and our inferences may not be correct. There may be no typical form of growth curve for all individuals, and a generalized form which we secure by pooling the results of many tests may be largely hypothetical. However, a generalized curve shows a certain sort of central trend, which is of some value.

As nearly as we can tell from the data thus far presented, the curve of mental growth from eight to fourteen or fifteen is either a close approximation to a straight line or it is somewhat convex.

Mental growth indicated by annual retests. We can use to advantage the data of Table 9, by assuming that the amount of mental ability as measured by all the tests we

used was an undefined amount, A, at age nine. Then the amounts would be those shown in Table 8.

TABLE 8. AMOUNT OF MENTAL ABILITY AT SUCCESSIVE AGES FROM NINE TO FIFTEEN, CALCULATED FROM THE GAINS SHOWN IN TABLE 9 BY ASSUMING AN ABILITY OF "A" AT NINE AND TAKING THE MEANS OF BOYS' AND GIRLS' ANNUAL GAINS

(Brooks)

AGE	AMOUNT OF MENTAL ABILITY Brooks's Data
9	A
10	A + .90
11	A + 1.64
12	A + 2.24
13	A + 2.77
14	A + 3.34
15	A + 3.83

The curves of Figs. 48 and 49 differ a little from a straight line, especially at the latter ages, indicating a slight convexity. If the individuals tested were a truly random or typical sample of general population, the curves probably would depart more from a straight line and show greater convexity, especially after fourteen or fifteen.[1]

Curves from an age-scale not true growth curves. Growth curves of intelligence obtained directly from age-level scales, like the Stanford-Binet, are really not growth curves at all. The unit of measurement is a year of mental age, but the equality of this unit at the various ages cannot be known from the scale itself; e.g., we cannot know from such scales whether a year of mental age at twelve is less than, equal to, or greater than a year of mental age at sixteen.

[1] The true significance of the curves of Figs. 48 and 49 depends in part upon the values of A and C, respectively. In the very nature of the case we do not know their exact amounts; but they are not enormous as compared with the amount of growth after the age of eight or nine. The best estimates we can make indicate that mental growth during the first eight years is considerably greater than during the succeeding eight or ten years.

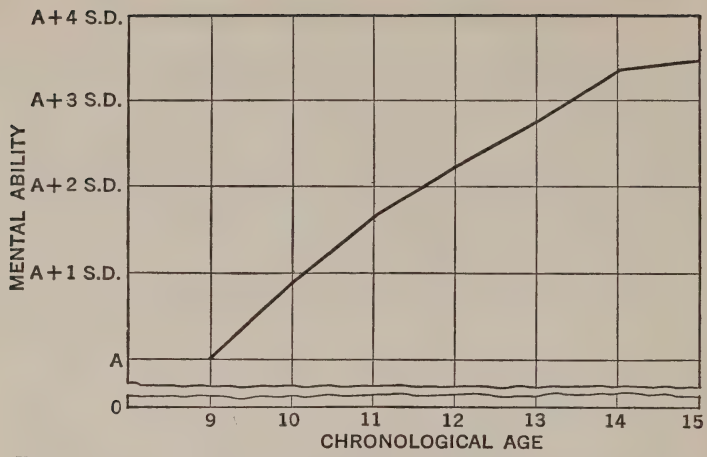

FIG. 48. MENTAL GROWTH CURVE, COMBINED FUNCTIONS, AGES 9 TO 15
(Retest data from Brooks.)

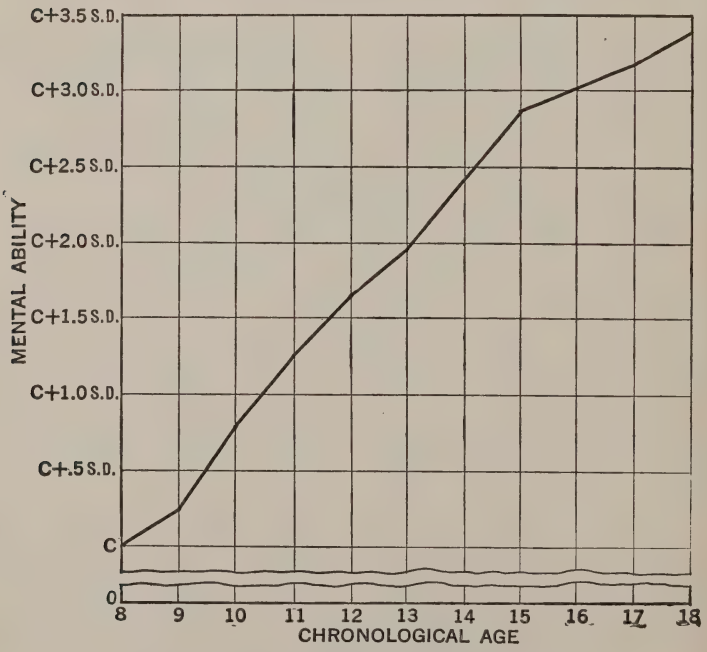

FIG. 49. MENTAL GROWTH CURVE, AGES 8 TO 18
Based upon the rate curves of Fig. 52. N = 19,312.

Standard procedure in devising this type of intelligence scale is to test typical or unselected children (a random sample) of the various ages, and locate the test items at the different ages by applying certain criteria to the test results. Roughly speaking, the mean performance of unselected or typical twelve-year-olds is what is meant by a mental age of twelve, whereas a mental age of fourteen refers to the average performance of unselected fourteen-year-olds. If the scale is well standardized, the average fourteen-year-old child will test at fourteen years of mental age; or, the average performance of a random sample of children fourteen years of age will be at the fourteen-year level. The results of such tests are of the greatest practical importance for child guidance and management, as we shall see in Chapters XVII and XVIII, but the curves derived from using these age-level scales show growth only in units whose magnitude is undefined.

Assuming for the present an approximate constancy of the I.Q. — that the ratio of mental age to chronological age is essentially the same from year to year — our problem of mental growth curves during adolescence is not so simple as merely representing normal growth by the straight line as in Fig. 50, in which each additional year of chronological age is accompanied by a year's increase in mental age. As we have already stated, the successive units of chronological age are equal, whereas those of mental age are not necessarily equal — they are merely normal for the particular age-level scale. If the normal mental growth each year from twelve to eighteen, expressed in equal units, was in the proportion of 6, 5, 4, 3, 2, and 1, respectively, then the true mental growth curve would be the curved line of Fig. 50, but we would not discover this fact from the age scale itself.

Conclusions. Consideration of available data leads us to believe that the curve which best represents normal mental

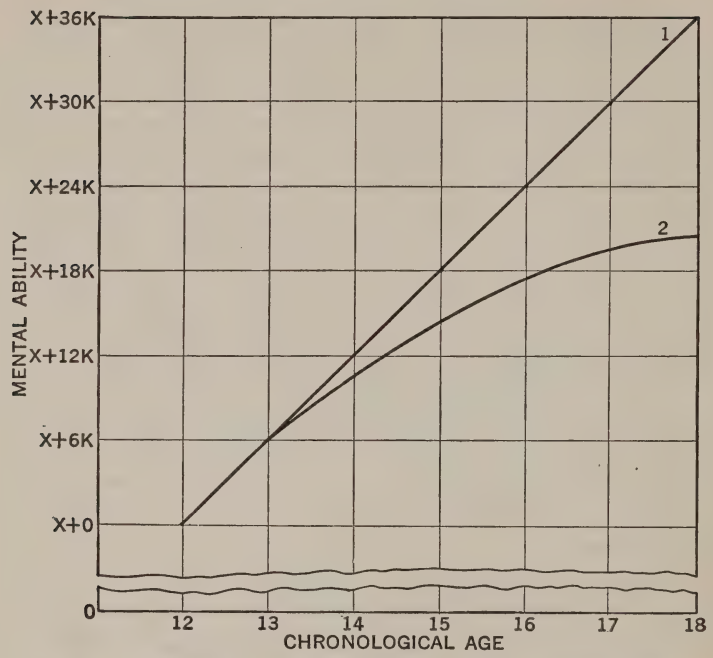

FIG. 50. THEORETICAL GROWTH CURVES OF INTELLIGENCE, AGES TWELVE TO EIGHTEEN

1. Curve based upon the assumption that a year of growth at any age equals a year of growth at any other age; that it is $6k$ each year, X being the mental age at twelve.

2 Curve based upon the assumption that the amounts of mental growth each year from twelve to eighteen are in the proportion of $6k$, $5k$, $4k$, $3k$, $2k$, and k, the mental age at twelve being X, as in 1. The differences between the successive age norms of the Otis Self-Administering Tests of Mental Ability, Intermediate Examination, for these ages are 6, 5, 4, 3, 2, and 1, respectively.

growth during the years from eight to eighteen is somewhat convex, with greater flattening in the late teens.

4. *The rate of mental growth*

Rate during adolescence. Our discussion of mental growth curves in the preceding section leads us to consider now in detail the rate of mental growth during adolescence, because rate is the determinant of the shape of growth

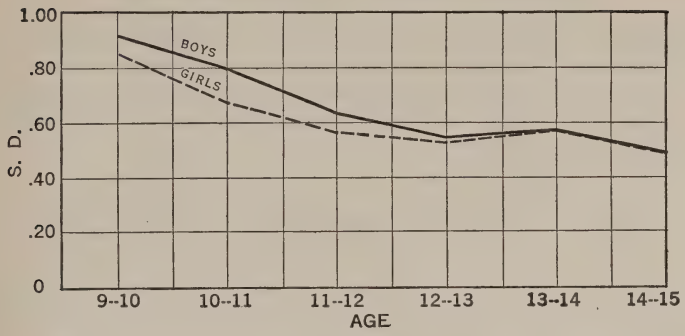

FIG. 51. RATE OF MENTAL GROWTH, AGES NINE TO FIFTEEN, COMBINED FUNCTIONS

(Brooks.)

Determined by annual retests. The gains at nine to ten are probably somewhat too high, on account of selection.

curves. In general, it may be stated that, although intelligence itself usually grows during adolescence, the rate of its growth, as nearly as we can determine it by our imperfect measuring instruments, generally decreases steadily, the rate curves themselves being not much different from straight lines with slightly negative slopes. The growth curves of Figs. 48 and 49 show the slower rates at the higher ages, but we have other evidence for these conclusions.

Rate of mental growth, ages nine to eighteen: Brooks, Woolley. In a study of mental growth between ages nine and fifteen the writer,[1] gave a wide variety of educational and psychological tests to 171 children annually for two or three years. Some of the tests measure relatively simple functions: — e.g., number cancellation, and handwriting; others measure memory and more complex abilities, e.g., directions, opposites, reasoning, substitutions, vocabulary, paragraph meaning, etc. The essential facts are shown in Table 9 and Fig. 51.

[1] *Changes in Mental Traits with Age, Determined by Annual Retests.* New York, 1921.

TABLE 9. MEAN GAINS, AGES NINE TO FIFTEEN, IN SIMPLER, MEMORY, HIGHER, INFORMATIONAL, AND COMBINED FUNCTIONS, EXPRESSED AS HUNDREDTHS OF THE MEAN STANDARD DEVIATION OF AGES ELEVEN, TWELVE, AND THIRTEEN — DETERMINED BY ANNUAL RETESTS

(Brooks, 1921)

AGES	SIMPLER		MEMORY		HIGHER		INFORMATIONAL		COMBINED*	
	B	G	B	G	B	G	B	G	B	G
9 to 10.....	62	75	77	80	101	95	103	81	93	86
10 to 11.....	71	61	58	51	85	76	88	68	80	68
11 to 12.....	71	42	53	43	73	65	51	57	63	57
12 to 13.....	64	55	29	45	68	59	43	47	54	53
13 to 14.....	102	69	10	48	68	68	50	40	57	57
14 to 15.....	54	63	27	39	60	54	44	41	49	49

* The gains in simpler, memory, higher, and informational functions were combined by weighting them roughly in accordance with the number and length of the tests used in each group of functions.

The rate shows a steady decline from year to year. At the first two ages it is probably too high, especially in the higher or more complex functions, because the pupils tested at these ages were more highly selected in respect to intellectual ability than those at the last two ages. Accordingly, the slope of the rate curves probably should not be as great as in Fig. 51, but it undoubtedly would still be slightly negative after making reasonable allowances for the influence of selection.

The writer, through the kindness of Dr. Woolley, had access to retest data which she had collected at Cincinnati, Ohio, during a period of five years, covering ages fourteen to eighteen.[1] While the tests used were not of such a wide variety as those used by the author, especially the tests of the higher mental processes, yet many more boys and girls were tested — 1507 at age fourteen, approximately one half of them being children who had quit school to go to work, and the other half being school children. At eighteen 653

[1] See Brooks, *op. cit.*, pp. 25–27, and 60.

were given the fifth annual testing, two thirds of the initial working group and only one fifth of the original school group. The results show a marked decrease in rate after fifteen.

The writer also combined the results of many investigations to secure greater reliability of data.[1] Fig. 52 shows the rate curves for 9578 boys and 9734 girls, ages eight to eighteen. Here again we find the decrease in rate at the later ages.

Rate of mental growth, ages fourteen to eighteen: Thorndike, Johnson. Thorndike concludes a study of the growth of intelligence of more than 8000 high-school students, ages fourteen to eighteen, tested twice at an interval of one year, by saying,[2] "any decrease in gain with age, if such there be, is offset by the selection of those more capable of gain"; and more recently[3] he holds that the decrease in rate of growth of intellect from fourteen to eighteen is "part of a general negative acceleration which began long before the age of six and one half."

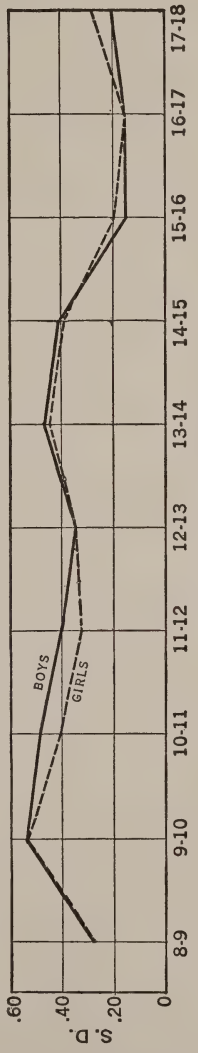

FIG. 52. RATE OF MENTAL GROWTH, AGES EIGHT TO EIGHTEEN, COMBINED FUNCTIONS
(Data from Brooks, 1921, page 64.)
In drawing Fig. 52, the vertical and horizontal scales were so chosen that a year's mental growth is, on the average, represented by approximately the same distance as a year of chronological age.

[1] Brooks, *op. cit.*, p. 64.

[2] Thorndike, *Journal of Educational Psychology*, vol. 14, pp. 516.

[3] Thorndike, *The Measurement of Intelligence*, p. 467.

Johnson's [1] results are important. He gave the Chicago group-intelligence tests twice, at an interval of one year, to 422 high-school students. The yearly gains from twelve to thirteen, thirteen to fourteen, etc., up to seventeen to eighteen, were in the proportion of thirteen, sixteen, thirteen, fifteen, twelve, and nineteen.

The rate of mental growth at puberty. All of these curves show little evidence of any great increase in the rate of mental growth at puberty. While it is quite true that curves derived from averages of many individuals, and especially of different individuals at the various ages, may really conceal individual variations in rate, yet it is also true that if the amount of increase in rate at puberty is as great as has been alleged, it should be noticeable at some time on these curves. If it occurs, it presumably takes place in some time-relation to puberty, and since a three-year period is likely to include the maturation of the vast majority of boys and girls, the growth curves or rate curves should show a noticeable rise at least during one of two or three years in the early teens. Figs. 51 and 52 show a slight indication of such positive acceleration in rate between thirteen and fourteen, and probably between fourteen and fifteen.[2]

Baldwin's curves (Fig. 54) cannot be taken as an indication of adolescent spurt in mental growth, since the equality of the units of measurement is unknown. If there are spurts in mental growth at adolescence, they are not very marked. The evidence gives no conclusive reason for believing that they do exist to any large extent. The problem is not, however, conclusively solved. Semi-annual retests by scales of known equality of units are needed.

[1] Johnson, *The Mental Growth Curve of Secondary-School Students.* 1923. Ph.D. thesis in Library of University of Chicago.

[2] Separate rate curves for boys and girls are not different from curves combined for boys and girls.

Relation of rate of growth to ability. A common view among psychologists is that brighter individuals grow more rapidly in intelligence than do the duller ones. Direct scientific evidence for this view is meager and inconclusive, but some indirect evidence and certain logical considerations which have been adduced do give it at least some plausibility. Such reasoning as the following is frequently used: a group of individuals sixteen years of age differ in intellectual ability; some have much and others little of it; much of it, at the least, develops after conception; obviously then, the average rate of growth of mental ability of the more intelligent individuals is greater than that of the less intelligent, and we may be reasonably sure that part of the differences at sixteen is caused by differences in rate of growth after birth.

In a study by the author,[1] the correlations between ability and gains in different mental functions at a two-year interval for sixty-seven individuals were as follows, the effect of range of chronological ages and the attenuating effect of the unreliabilities of the tests being eliminated:

I.Q. and gains in simpler mental functions	.206
I.Q. and gains in memory functions	.266
I.Q. and gains in higher mental functions	.356
I.Q. and gains in informational functions	−.054

The highest of these coefficients indicates only a slight positive relation between ability and gain. The low negative correlation is spurious, and the coefficient of .356 is less than it would have been with adequate tests since the gains of many of the abler pupils were not fully determined. In Johnson's study the groups of high-school students below the average in intelligence gained more points on the Chicago group-intelligence test, in a year's time, than did

[1] Brooks, *op. cit.*, pp. 81 ff.

the groups above the average at all ages except from seventeen to eighteen.

Non-retest data are not suited to give very precise information on this problem, especially since the spread of scores on tests at the higher school-ages is narrowed by selection: for example, the variability on Army Alpha of approximately 64,000 enlisted men in four camps was nearly one and three fourth times the variability of ninth-grade pupils, and almost twice that of college freshmen who took the same test.[1] The Otis percentile curves (Fig. 55) probably would show some divergence, if selection at ages twelve to eighteen were the same as at the earlier years, and probably would show even more divergence, if a true sample of general population at each age had been used. Greater divergence on point scales is one line of evidence of different rates of growth, which we infer, for reasons previously stated, to be in favor of those of superior intellect.

Kuhlmann[2] says, in his retest study, that "the feebleminded do develop mentally, and at a rate in proportion to the grade of intelligence." His results are suggestive rather than conclusive, because he used an age-level scale of the Binet type which does not yield directly an accurate determination of the rate of growth, as we have already observed (see pages 95 and 97).

In his recent work on the *Measurement of Intelligence*, Thorndike states (page 288) that he has evidence of a "positive relation of gain to ability" at the ages above fourteen, although its exact nature and amount are unknown. The fact that the intelligence scores of a group of adolescents correlate closely with their scores a year or two later, although they have become somewhat more divergent in ability during the interval, suggests, but, so far as we have

[1] Thorndike, *The Measurement of Intelligence*, p. 562.

[2] *Journal of Applied Psychology*, vol. 5, pp. 195–224.

evidence at the present time, does not prove, a differential in rate favorable to those who are more gifted intellectually. Here is another problem needing further investigation. Our own tentative conclusion is, that, although individuals differ in their rates of mental growth, the superior individuals, on the average, probably grow more rapidly than those of average or inferior ability.

5. *Variability of individual performance on mental tests: the constancy of the intelligence quotient*

Variation in scores on retests. A baffling problem in measuring the intelligence of human beings of all ages is the variability of the individual's performance on repeated tests. If he is given many tests, his scores are not all the same, but differ by smaller or larger amounts. In the physical sciences the problem is less complex. Errors of measurement are more easily detected, and, if merely chance errors, or inaccuracies due to instruments, they can be guarded against. Since the essential factors can be more easily controlled, the variability of phenomena under varying conditions can be more readily observed and the laws discovered which govern their variation. The variation of an individual's scores on repeated mental tests offers many interesting problems to the student of adolescence; but we limit our discussion to three of them — the extent, the causes, and the significance of this variability.

The constancy of the I.Q. The relative ranks of a group of students on an initial test and on a repeated test, or the difference between each individual's I.Q.'s on two trials of a test, is definitely the problem of the constancy of the I.Q., or consistency of performance. Under normal conditions the ratio of an adolescent's mental age to his chronological age fluctuates slightly from year to year. Many studies [1] in-

[1] See, for example, *Journal of Educational Psychology*, vol. 12, pp. 315–22; vol. 13, pp. 307–12; vol. 16, pp. 341–43; etc.

dicate that the average change, as measured by such tests as the Stanford-Binet, is four or five points. On the basis of 435 I.Q. comparisons Terman says: [1]

> It makes little difference whether the child was bright, average, or dull, how long an interval separated the tests, or what the age of the child was at the earlier test. The majority of the changes are for all groups relatively small . . . the probable error of a prediction based on the first test is 4.5 points in terms of I.Q.

In general, other studies corroborate Terman's conclusions. If we have measured a child's intelligence carefully, at intervals of a few days or several years, the chances are not very great (from about one in seven to one in twelve) that the difference between his I.Q.'s on the two trials will be more than ten points.

If the intelligence of pupils of the same age or the same grade in high school be measured by a good test, and then remeasured a year or two later, a pupil is likely to have about the same standing (relative to the whole group) on the second test as on the first. The two sets of scores are likely to correlate .70 or more. Woodyard [2] reports correlations of .70, .81, .67, and .82 between two trials of two group intelligence tests which were given a year apart to two groups, each composed of two hundred and fifty fifteen-year-old pupils in the ninth grade at the first testing. For ninth-grade pupils of all ages the correlations would have been higher. The writer,[3] after eliminating chronological age as a factor, found the correlations between the scores obtained at a two-year interval by sixty-seven boys and girls, approximately two thirds of whom were adolescents. The simple coefficients ranged from .56 to .93 (Table 10). Correcting the coefficients for the attenuating

[1] Terman, *The Intelligence of School Children*, p. 140.

[2] *The Effect of Time upon Variability*, p. 12.

[3] Brooks, *op. cit.*, pp. 74 f.

TABLE 10. CORRELATION BETWEEN MENTAL TRAITS MEASURED AT A TWO-YEAR INTERVAL: UNCORRECTED

(Brooks)

	SIMPLER	MEMORY	HIGHER	INFORMATIONAL
Boys	.640	.626	.838	.930
Girls	.818	.562	.868	.895

TABLE 11. CORRELATION BETWEEN MENTAL TRAITS AT A TWO-YEAR INTERVAL: CORRECTED FOR ATTENUATION

(Brooks)

	SIMPLER	MEMORY	HIGHER	INFORMATIONAL
Boys	.703	.679	.884	.994
Girls	.959	.642	.937	.938

affect of the unreliability of the tests used, the probably true relationships range from .64 to .99 (Table 11).

These few samples, chosen from a great mass of data, indicate that a child's rank in mental ability is relatively permanent; that, as a matter of fact, his mental-growth-curve is not likely to cross and recross those of other individuals, except in cases in which they are of nearly the same intelligence at the initial testing. The I.Q., then, is a fairly safe basis of prediction within the limits of a probable error of four or five points. The *really stupid* boy at twelve or fourteen will not be one of the brighter boys at sixteen, neither will the *really brilliant* boy at thirteen, barring accident and mental disease, be the dullard or even the average youth a year or two later.

Another approach to this problem may be made on the neurological side. While it is true that very little is definitely known about the development of the central nervous system, especially of the cerebrum, yet there seems to be little reason for believing that, under ordinary circumstances (apart from disease, accident, etc.), where all have essentially similar surroundings, the total organization of the youth's neurones — the physical basis of his intelligence — would fluctuate in such fashion that at the age of, say

thirteen, he would rank in intelligence among the top ten per cent of a group, but a year or two later would rank only at or below the average of the same group.

Causes of variation in individual performance. Little is known about the causes of the variability in individual performance. The common assumption, that the time elapsing between testings is an important factor, is shown by recent experimental investigation to be incorrect. Woodyard [1] made a careful study of this problem for a wide range of ages and abilities, and found that the variability of an individual's performance was almost as great after a few hours as after a few days, and that it was about as much after a week as after a year. Other data point to the same conclusions. Remote retests correlate with initial tests almost as closely as immediate ones.[2]

Individual performance varies, but we do not know whether fatigue, distractions, interest, some subtle rhythm of attention(?), or other factors cause it to vary. Apparently, lapse of time has but little influence. Then too, there is some evidence that the variations of individual performance are not closely related to ability — that the bright child is not likely to be more variable on repeated tests than the dull child — although there is a very slight possibility, according to Thorndike, that the variability of individual performance is a little greater among individuals at the extremes of mental ability than among those at the average; but of this we cannot be sure, since the differences found may be due to the limited test items at the higher and lower ranges.[3]

[1] *Op. cit.*

[2] E.g., cf. Baldwin and Stecher, *Journal of Educational Psychology*, vol. 13, p. 556.

[3] The author found (see *School Review*, vol. 34, pp. 333–42) correlations of .459 and −.442 between the amount of deviations of I.Q. on nine group intelligence tests and (1) I.Q. and (2) chronological age, respectively, for one

6. *Age of cessation of mental growth*

Divergent views on the age of cessation of growth in intelligence. Does the youth grow in intelligence until near complete physical maturity and development, or do his intellectual powers reach their maximum in the early teens? The evidence has led to much disagreement in the answers to this question, as the following quotations show:

Terman, 1916: "Native intelligence, in so far as it can be measured by tests now available, appears to improve but little after the age of fifteen or sixteen years." [1]

Doll, 1921: "There is reason to believe that the true age of average arrest of mental age growth is actually between thirteen and fourteen." [2]

Brooks, 1921: "As to age of cessation of mental growth, our retest data show growth until age fifteen, the highest age tested." [3]

Whipple, 1923: ". . . Our test scores indicate the maturing at the same time [early adolescence] of whatever we are measuring." [4]

Thorndike, 1927: "The gain in altitude of intellect of the sort measured by existing intelligence tests is not zero after fourteen, or after fifteen, or even after sixteen. It decreases, but it should not become inappreciable until eighteen or later." [5]

Evidence indicating mental growth until the late teens. The norms of group-intelligence tests, derived from testing many thousands of individuals, are evidence that mental growth continues well on toward the late teens (see Figs. 46, 47, and 55), and give no support to the view that intelligence ceases to grow after the chronological age of thirteen

hundred and eight first-year junior-high-school pupils. If, however, the first of these coefficients is freed from any spurious index correlation by allowing for the chronological age distribution, I.Q. and variation on the group tests correlate but .230, a result essentially in agreement with Thorndike's conclusion from much more extensive data.

[1] *The Measurement of Intelligence*, p. 140.

[2] *Psychological Monographs*, vol. 29, no. 2, p. 15.

[3] *Changes in Mental Traits with Age, Determined by Annual Retests*, p. 83.

[4] *School and Society*, vol. 17, p. 597.

[5] *The Measurement of Intelligence*, p. 467.

or fourteen years. Of course, the norms at the higher ages are often too high, because they are based upon tests given to students in school who are of average and above-average intelligence, and some allowance must be made for the probable fact that duller individuals may not increase their intelligence scores until as high ages as do the brighter ones.

Terman,[1] analyzing retest data from Doll on ninety-five feeble-minded children under fifteen years of age at the first testing, has shown that those whose final mental age is four or five years grow mentally relatively little after chronological age eleven; that those whose final mental age is six, seven, or eight years grow mentally but little after chronological age twelve; and that those "who reach the mental age of nine or ten continue to develop until sixteen."

Kuhlmann [2] retested six hundred and thirty-nine feeble-minded individuals every two years for a period of ten years, using the Kuhlmann revision of the Binet-Simon intelligence scale. He found idiots developing until chronological age fifteen, inclusive; imbeciles until fifteen or sixteen; morons until about seventeen; and borderline cases until the age of approximately eighteen years (see Fig. 53). He also found that thirty-five per cent of the idiots deteriorated mentally as they got older, twenty-three per cent of the imbeciles, twelve per cent of the morons, and two per cent of the borderline cases, or a total of sixteen per cent of the entire group.

The writer [3] determined, by annual retests of 171 pupils, the gains on a wide variety of mental tests from ages nine to fifteen (see Table 9, and Fig. 51). The data show no indication of an early cessation of mental growth after age fifteen, the highest one tested — really fifteen and one half,

[1] *Journal of Educational Psychology*, vol. 12, p. 328.

[2] *Journal of Applied Psychology*, vol. 5, pp. 195–224.

[3] Brooks, *op. cit.*, 1921.

since fifteen includes all who had passed their fifteenth but had not reached their sixteenth birthday. Furthermore, reference to the rate-curves of Fig. 52, which are based upon the test records of 19,312 individuals between ages eight and

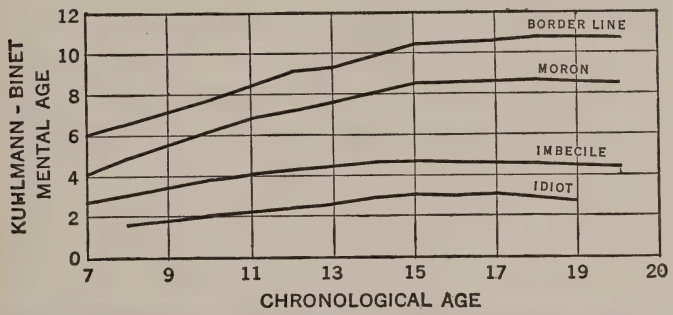

FIG. 53. MENTAL AGES OF 639 FEEBLE-MINDED, RETESTED EVERY TWO YEARS FOR A PERIOD OF TEN YEARS

(Kuhlmann.)

These curves do not show the absolute rate of mental growth from year to year, because the units of measurement, a year of mental age, are not necessarily equal at all ages.

eighteen, indicates a continuance of mental growth until eighteen or later for the populations tested. While selection in respect to ability may have affected the results at the later ages, we doubt that the elimination of its influence would show cessation of growth a year or two earlier. For example, a group of 757 pupils who quit school at fourteen to go to work were tested annually by Woolley for five years. At eighteen, 504 of the original group of fourteen-year-olds were tested for the fifth time. They probably were not much above the average in intelligence, because as a group they were one, two, or three years retarded in school. At fourteen their grade distribution as they left public, private, and parochial schools to go to work was as follows:

Grade	V	VI	VII	VIII	IX
Per cent reaching	26	30	28	15	1

While the battery of tests used [1] was not as comprehensive as we would wish, yet it does furnish some evidence on our problem. The gains from fourteen to fifteen, fifteen to sixteen, etc., were in the proportion of 26.7, 14.1, 6.4, and 13.0, respectively.

Baldwin and Stecher,[2] using the Stanford-Binet scale, retested approximately two hundred children of normal and superior intelligence from two to six times, with intervals of six months to two and one half years between testings, and found mental growth continuing until chronological age sixteen, the highest age tested (see Fig. 54).

Thorndike[3] reports the results of an investigation which is a very important contribution to our problem. In May, 1922, and again in May, 1923, intelligence tests were given to 8564 students in seventeen high schools in several cities. The tests were equated in difficulty and the amount of practice effect from taking them was determined and deducted. He found mental growth continuing until age eighteen at a rate of approximately "ten months of mental age around fourteen." Johnson's[4] retests of 422 high-school students after the lapse of one year showed pupils gaining each year from twelve to eighteen.

All of the evidence presented thus far indicates that mental growth continues, on the average, until the late teens. Whether we take intelligence-test norms, or scores made by many different individuals at the various ages, or, better still, retest the same individuals, as Baldwin, Brooks, Doll, Johnson, Kuhlmann, and Thorndike have done, the results consistently point to the conclusion stated above — a conclusion also in accord with critical common-sense

[1] See Brooks, *op. cit.*, pp. 72 ff.

[2] *Mental Growth Curve of Normal and Superior Children, and Supplement.* University of Iowa Studies in Child Welfare, vol. II, no. 1.

[3] *Journal of Educational Psychology,* vol. 14, pp. 513–16.

[4] *Mental Growth Curve of Secondary School Students.*

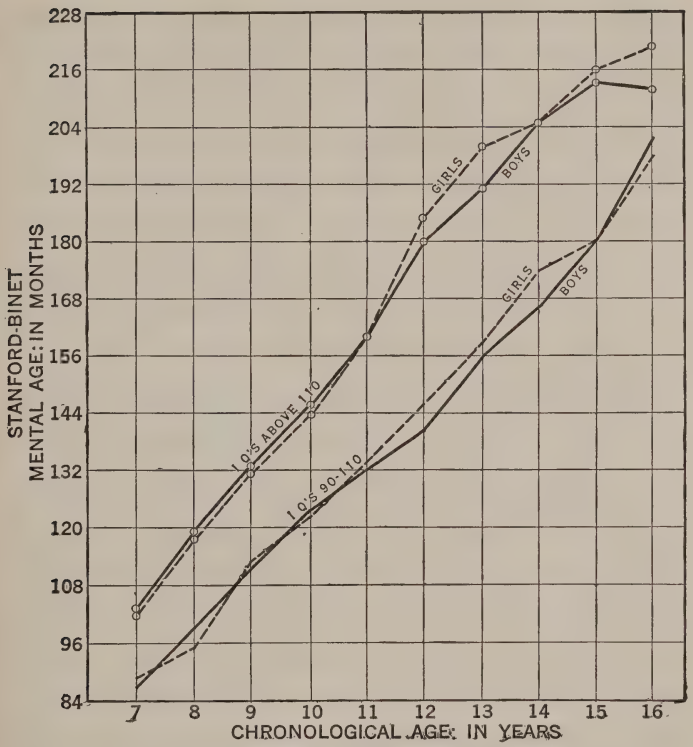

FIG. 54. STANFORD-BINET MENTAL AGES OF CHILDREN OF NORMAL AND SUPERIOR INTELLIGENCE AT SUCCESSIVE CHRONOLOGICAL AGES

(Data from Baldwin and Stecher.)

Determined by retests. These curves show mental growth continuing until age sixteen, the highest age tested. There are not enough tests on the Stanford-Binet to measure adequately older children of superior intelligence. The unit of measurement is a year of mental age. Since we do not know, from the test itself, the exact relative sizes of a year of mental age at the various ages — whether, at twelve, for example, it is greater than, equal to, or less than at sixteen — these curves do not show the exact rate of mental growth from year to year.

observation. In view of all these converging lines of evidence, we do not believe that the child at thirteen or fourteen normally has reached the limit of growth of his intelligence. Nor do we see how it can be maintained that

the individual's "ability to adapt to relatively new situations," or some other feature of his "innate capacity or intelligence," is the thing that ceases to grow at, say, fourteen, and that after that he merely acquires more facts, more knowledge, and wider experience in doing various sorts of things. Our knowledge of mental growth until age fourteen is derived from the same sort of measuring instruments (often exactly the same ones) as are used to give us information about ages fourteen to eighteen. Since they do show growth until age eighteen, the writer sees no valid reason for calling it one thing up to a certain age, and then calling it something else after that time.

Evidence of the cessation of mental growth in the early teens. Let us, therefore, examine the evidence or seek an explanation for the widespread view of an early teen-age cessation of mental growth. Undoubtedly, the most powerful influence determining this belief has been the interpretations placed upon the results of the Army testing during the World War. Because the mean mental age of nearly one hundred thousand white recruits was approximately thirteen years on the Army Alpha and Beta Examinations, and because the mean mental age of six hundred and fifty-three unselected white enlisted men was 13.4 years on an abbreviated Stanford-Binet intelligence scale, it has been widely assumed that the growth of intelligence ceases, on the average, about the thirteenth or fourteenth year. Upon reflection, it seems quite clear that the Army test results — whatever their value may be in estimating the mean mental age of adults — do not show, and, in the very nature of the case, cannot be expected to show, the chronological age at which the individual ceases to grow in intelligence. When we retest adolescents in broad and narrow, simple or complex mental functions, or in a composite of many quite dissimilar intellectual tasks, and find the evidence consistent

and reliable, and clearly indicating mental growth until the late teens, we are forced to conclude that it really does continue until these years.

Dearborn [1] has found some evidence from his group intelligence tests that chronological age fourteen and a half years is better than sixteen years in computing the intelligence quotients of adults, but his tests, according to Freeman, may be too easy or not suited to youths older than this age.

Nature of mental growth after fifteen or sixteen. On the basis of observation it seems quite true that the man at twenty-five or thirty can plan more effectively; that he can reason better on complex problems involving a diversity of events, people, motives, and abstract relations; that he can manage himself and his affairs more efficiently; that he has greater power of adjusting himself to increasingly complex situations; and that he possesses these highly significant abilities in greater measure than at fifteen. We see no reason for believing that *these* greater capacities are due merely to either the greater number of experiences or a greater familiarity with life situations, whereas the increase in scores on stock intelligence tests up to the age of fifteen is to be regarded as due to the growth of intelligence; but rather do we believe that the increase of the former represents an augmenting of that power of handling complex affairs or situations which is called intelligence. Furthermore, we are inclined to believe that any increase after age twenty in abilities of the sort just mentioned must be included as evidence of the growth of intelligence, as well as any increase in the ability to solve arithmetical problems, memorize digits, give relatively narrow school information, define words, give opposites, make substitutions, or do any of the other tasks of the present-day intelligence examinations.

[1] *Journal of Educational Research*, vol. 6, pp. 307–25.

On this point Thorndike [1] says: "The verbal and mathematical tasks which bulk so largely in these examinations may be more like those which occupy the intellects of children from five to fifteen, than those which occupy the intellects of young people from fifteen to twenty-five, or those which occupy the intellects of men and women from twenty-five to thirty-five"; and he notes further that the development of specialized abilities may begin "their rapid rise in altitude at an age when CAVD [2] altitude has almost ceased to gain."

Level of intelligence and age of cessation of mental growth. Individuals vary in the age of cessation of mental growth. Some of the evidence presented thus far is also suggestive of the relation between degree or level of intelligence and the age at which it ceases to grow, but it is not conclusive, because of scanty retest data at the higher ages, especially for individuals of normal and superior mental ability. It seems certain that low-grade intelligence is not arrested in its growth at the early age suggested by Stern. Within broad limits, the retest data presented indicate very roughly that individuals of higher intelligence develop longer than do those of the lower grades of intelligence, but we cannot safely infer much about those of average ability. On the contrary, the norms of group tests show increase in scores until about the same age for the various percentiles; e.g., the scores of the lowest quartile (see Fig. 55) increase until about the same chronological age as those of the median and seventy-five percentile individuals; but these results are not from retests and the range of ability at the later ages is greatly narrowed by selection. From common observation of the interests and occupations of the gifted and less gifted

[1] *Op. cit.*, p. 468.

[2] CAVD = intellect as defined by an elaborate series of tests made up of completion, arithmetic reasoning, vocabulary, and directions.

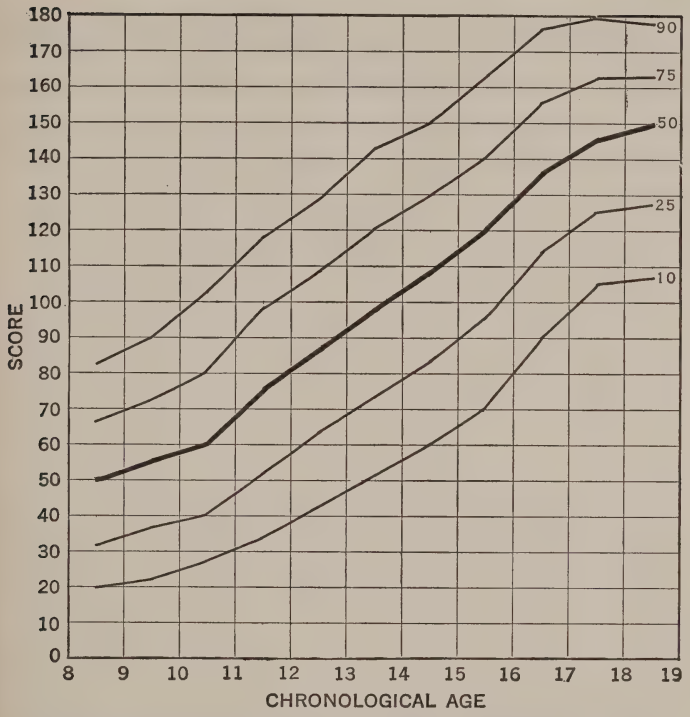

FIG. 55. PERCENTILE SCORES, AGES EIGHT TO NINETEEN, ON THE OTIS GROUP INTELLIGENCE SCALE, ADVANCED EXAMINATION
N = 25,226.

we would expect the stimuli to intellectual development to continue longer for the former than for the latter.

7. *The mental age of adults*

Average adult ability. We need give little attention for our present purposes to the problem of the mental age of adults. If mental growth continues until the age of eighteen, or later, as the evidence of the preceding section indicates; and if, by a certain mental age we mean the average per-

formance of unselected individuals of that age; then, the average mental age of adults would be the average chronological age at which mental growth ceases. Now average adults do not show a mental age of eighteen years on existing intelligence tests of the Stanford-Binet type, and probably, not even sixteen. Although groups tested in the army, to which we referred in the foregoing section, may have been a little below the average ability of adult population, and although the conditions under which the tests were given often did not evoke the men's best efforts; yet we do not believe that these two sources of error account for reducing to 13.4 years a mean mental age which really was sixteen, or possibly eighteen years.

Symonds [1] has presented data showing that the population of the United States "compares very closely in mean and variability with the distribution found in the army," and that "the median I.Q. of the general population would be about eighty, say between eighty and eighty-two, as Terman computes adult I.Q.'s"; in other words that the intelligence scales were standardized upon a selected rather than an unselected or average group, and that average adult ability is really ability to do half the Stanford-Binet tests at the fourteen-year level. If the average adult Stanford-Binet I.Q. is eighty-two, as Symonds suggests, then a mean mental age of 13.4 on such a test is really sixteen years, four months, on a test standardized upon unselected general population ($13.4 \div .82 = 16.34$).

Another consideration of importance is that tests standardized upon children are not necessarily appropriate to measure the abilities of adults. The individual's interests after leaving school lie in other directions, and many of the "school-type" tasks which he remembered and could do at fourteen, he has forgotten or doesn't care enough about to

[1] *Journal of Educational Psychology*, vol. 14, pp. 65–82.

attempt to do at twenty-four — they do not appeal to him as worth while. The defects of our measuring instruments must be allowed for or taken into consideration, if we would not fall into error.

If then, we restate our problem to read, "What is the average mental age of general population at the close of adolescence on such tests as the Stanford-Binet or Army Alpha?" we can answer with some assurance of reasonable accuracy by saying, "Probably not more than fourteen years"; but we would hasten to add that this tells us nothing of the chronological age at which mental growth ceases, nor does it mean that such tests are equally well-suited to measure the mental abilities of children and adults.

8. *The effect of adolescent growth upon the range of individual differences in mental traits*

What is the effect of age upon the range of individual differences in mental traits? Are fourteen- or sixteen-year-olds, for example, more or less alike in mental traits than they were at eight or ten years of age? Answers to questions such as these are of practical importance, especially in problems relating to the organization, instruction, and curricula of secondary schools.

Increase in range of individual differences at adolescence: G. Stanley Hall. G. Stanley Hall has been the most eminent proponent of the view that individual differences are increased at adolescence. Referring to the adolescent period, he says, "The range of individual differences and average errors in all physical measurements and all psychic tests increases." [1] "Individual differences of all kinds are now suddenly augmented." [2] This view has been generally ac-

[1] *Youth: Its Education, Regimen, and Hygiene*, p. 6.

[2] *Adolescence*, vol. II, p. 363.

cepted until recently called in question by Henmon and Livingston.[1]

We are concerned here with the problem of the variability in mental traits at various ages, rather than with that of variation in physical traits.

Decrease in range of individual differences at adolescence: Henmon and Livingston. Henmon and Livingston selected a wide variety of mental-test results from various sources, and used as the measure of variability the coefficient of variation proposed by Karl Pearson,

$$\frac{\text{Standard Deviation} \times 100}{\text{Mean}}.$$

They conclude that "there is in the school groups a marked reduction in variability at adolescence as contrasted with childhood"; and that "in a certain sense it may be true that the range of differences is greater at adolescence if we include at each age the mentally deficient whose abilities in any test would be zero . . ."; but "even so, . . . it is pretty certain that the average variability would not show an increase with age, provided a proportionate number of borderline and feeble-minded children were tested and these results included in the distributions." "There is then a possibility that individual differences may increase at adolescence but there is not evidence that they actually do."

As a sample of their data, we present the first three columns of Table 12. We have added in the fourth column the quartile deviation (Q or semi-interquartile range) for each grade showing half the range of the scores of the middle fifty per cent of pupils in each grade.

Measures of range of individual differences in mental traits. Since our problem is, "Do individuals become more or less alike in mental traits at adolescence?", our first task

[1] *Journal of Educational Psychology*, vol. 13, pp. 17–29.

is to determine what are the appropriate measures to use in answering it. Three measures are available.

(1) *The total distribution of scores.* We may compare the total distributions of the scores on various mental tests at various ages; for example, the distribution of the scores on

TABLE 12. PEARSON COEFFICIENTS OF VARIATION AND QUARTILE DEVIATIONS IN LANGUAGE COMPLETION BY GRADES

(Henmon and Livingston, and Trabue)

GRADE	NUMBER OF CASES	PEARSON COEFFICIENT OF VARIATION	QUARTILE DEVIATION
2	1318	.454	2.085
3	1437	.380	3.413
4	1463	.290	4.157
5	1507	.196	3.614
6	1454	.165	3.610
7	1456	.148	3.750
8	1427	.144	4.041
9	273	.140	4.232
10	171	.116	3.899
11	136	.094	3.372
12	103	.103	3.844

an opposites test of a group of twelve-year-old children, with the distributions of the scores on the same test of the same group (or typical groups) at ages thirteen, fourteen, etc., and note any changes in the distributions as we pass to the adolescent ages. Suppose, for example, that we tested the same group of fifty pupils annually for five years, and that the distributions of their scores on an opposites test were as shown in Table 13, practice effect from taking the tests being eliminated or properly allowed for; then we would conclude that individuals become less alike at puberty.

This is a useful procedure, because all the available facts are included, but it cannot be used to compare distributions in dissimilar mental traits because of the difference in units of measurement, as we see presently.

TABLE 13. HYPOTHETICAL DISTRIBUTION OF SCORES ON AN OPPOSITES TEST, GIVEN TO THE SAME GROUP OF PUPILS ANNUALLY FOR FIVE YEARS

SCORE	NUMBER MAKING EACH SCORE AT AGES				
	12	13	14	15	16
0	2	2	1	1	1
1– 2	6	5	3	2	2
3– 4	10	8	6	5	5
5– 6	14	10	9	7	6
7– 8	10	10	12	9	8
9–10	6	8	8	9	9
11–12	2	5	6	7	7
13–14		2	3	5	6
15–16			2	3	3
17–18				2	2
19–20					1

(2) *The absolute or gross variability of scores.* We may take some measure of absolute or "gross" variability, such as the range of scores, their standard deviation, semi-interquartile range, or some other measure of dispersion, which tells roughly how much the scores are bunched or spread about the mean or median. If we use a measure of absolute variability, we would compare the standard deviation, for example, of the scores of twelve-year-old pupils with that of individuals at each successive age, and see what are the changes in the gross variability. Thus, if the S.D. (standard deviation) on the opposites test of a group of fifty twelve-year-olds were 2.84, and if the S.D.'s of the same group at the next four ages were 3.44, 3.63, 4.17, and 4.43, respectively, we would conclude that individual differences increase at puberty and early adolescence; but if the S.D.'s for ages twelve to fifteen were just the reverse, i.e., if they were 4.43, 4.17, 3.63, 3.44, and 2.84, respectively, we would conclude that individual differences were decreasing at puberty and early adolescence.

(3) *The relative variability, e.g., the Pearson coefficient of*

variation. We may use a measure of relative variability, such as the Pearson coefficient of variation, employed by Henmon and Livingston, which shows the ratio of absolute variability to the mean (or other measure of central tendency). This is valuable when we want to compare the variabilities of traits which are measured in different units. Thus, if we want to know whether pupils at fourteen are more variable in height than in weight, we cannot compare either the total distributions or the gross variabilities directly, because one is expressed in linear units (e.g., inches) and the other in units of weight (e.g., pounds); but by dividing the absolute variabilities in height and weight by the respective means we make some allowance for the incommensurability of the units and may compare the resulting ratios.

Similarly, in mental traits. Suppose we have the variabilities of the scores on two carefully graded mental tests — an opposites test on which the scores may range from zero to twenty, and a substitution test on which they may range from zero to one hundred and sixty. The units on the two tests are not the same. The range from very little to very much of the first sort of ability is divided into twenty units; but that of the second sort, into one hundred and sixty units. Here the coefficient of variation, by expressing the absolute variability as a fraction of the mean, is regarded as one appropriate way of rendering the absolute variabilities comparable.

Or again, if we want to know the significance of variability as a phenomenon of growth, the coefficient of variation may be the appropriate measure just because, for some theoretical purposes, the changes in variability are considered as functions of the amount of the ability already possessed. In all such cases, the exact meaning of the coefficient of variation must be kept in mind; it is a measure of relative

variability, of the ratio of the absolute variability to the average amount of the trait possessed by the group in question; and in our problem it merely shows whether or not the dispersion of any mental trait (or combination of traits) at each successive age is proportionate to the mean or median score of that age, the scores usually increasing from one age to the next, as we have already seen.

But for many purposes it is not the appropriate measure at all. If one were providing uniforms for two summer camps, one composed of boys twelve years old, and the other composed of boys sixteen years old, the essential information would not be the relative variabilities of sizes as shown by the coefficients of variation at the two ages, but rather the range of sizes and the frequency of each. Similarly, in seating ninth-grade pupils and tenth-grade pupils in "home rooms" in the secondary school, we care not at all for the coefficients of variation in needed heights of seats and desks. Here again, the absolute variability, or the range and the frequency of different heights, would be the appropriate information. In the case of mental traits, similar practical considerations often make the coefficient of variation an inappropriate measure, the really significant features of the data being shown by the total distributions, the range, or some other measure of gross variability.[1] There is danger that Henmon and Livingston's data will be taken at their face value as evidence that pupils become more alike at adolescence, and that the range of individual differences in mental traits becomes less and less as children get older or pass to the higher grades in school. This is not their true import. They mean merely that the ratio of the absolute variability to the mean or median probably decreases — whatever this fact may signify for the actual direction, training, instruction and control in school, home, and voca-

[1] See pp. 132–34 of Thorndike's *Mental and Social Measurements.*

tion. Accordingly, we reject it as a measure of the range of individual differences in mental traits at puberty, and use the other more appropriate ones.

Evidence on the variability of mental traits at adolescence. If now we examine the coefficients of variation in Table 12, we see that they decrease from the second to the eleventh grade, being in the ninth grade less than one third as large as in the second grade. If we note, however, the quartile deviations in the last column of this Table, we see that the gross variability of the second grade is less than one half that of the ninth grade. What do these facts mean? Merely that the scores of the higher grade are more variable than those of the lower one, and that the median scores increase so much more rapidly than the quartile deviations that the ratio of the latter to the former (i.e., the coefficient of variation) is smaller in the ninth grade.

The range of the middle fifty per cent of the Haggerty reading scores in the New York Rural School Survey are larger from twelve to sixteen than at ten, eleven, seventeen, or eighteen, being approximately as follows:

Age.....	10	11	12	13	14	15	16	17	18
Q3–Q1.....	27	33	47	42	41	41	38	36	32

The percentile curves of the National Intelligence Scale norms (see Fig. 47) show a very slight decrease in variability from twelve to fourteen and a greater decrease the following year. The Otis percentile curves (see Fig. 55) and the distribution curves in the *Otis Manual of Directions* (page 62) show a slight increase in variability at thirteen, fourteen, and fifteen. The total range of scores on the Terman group intelligence test and the range of scores of the middle fifty per cent increase from Grade VII to Grade XI, but decrease in Grade XII (see Table 14).

Since many pupils of less intellectual ability do not reach

TABLE 14. VARIABILITY OF SCORES ON THE TERMAN GROUP TEST OF MENTAL ABILITY IN GRADES SEVEN TO TWELVE

(From *Manual of Directions*, page 9)

N = 41,372

GRADE	NUMBER OF CASES	TOTAL RANGE	RANGE OF MIDDLE 50 PER CENT	MEDIAN
7	5,582	127	37	68
8	9,087	140	43	89
9	10,881	146	47	104
10	6,730	146	49	122
11	4,206	148	51	138
12	4,886	144	47	147

the higher grades in the secondary school, the grade groups tend to become a narrower selection of the total school population, so that the variability in the higher grades is smaller than would be found if all the seventh-grade pupils had been retested annually for the succeeding five years. Then, too, the variability in mental traits of total or general population at any teen age is likely to be greater than that found in school groups of the same age.

On an English test, given to 14,151 pupils in a large number of Kansas high schools, the range of the middle fifty per cent of the scores increased from Grade IX to Grade XII, being 15.1, 19.4, 20.5, and 22.0, respectively.

Even with the restricted range of scores due to selection in the case of school children of the adolescent years; and with the further limitation that the effect of growth upon the range of individual differences in mental capacities cannot properly be inferred from the averages of data from many different individuals at the various ages; yet the evidence we have presented thus far indicates at least that individual differences do not decrease steadily with age, but may increase a little at puberty.

Crucial evidence from consecutive yearly measurements. Crucial evidence will be derived from retesting the same in-

dividuals at yearly or shorter intervals. The author's own retesting program did not include a large enough number of cases to give a conclusive answer to the question, even for the ages tested. Contrasting the three-year period from thirteen to fifteen with ages ten to twelve, we find that both boys and girls were more variable on two thirds of the tests at the older ages, and that their scores were more widely dispersed at the earlier period on only one third of the tests.

A year's mental growth of the high-school students retested by Johnson [1] seems to have increased the variabilities of their scores on the Chicago group intelligence tests at all

TABLE 15. STANDARD DEVIATIONS OF INTELLIGENCE TEST SCORES OF HIGH-SCHOOL PUPILS TESTED TWICE AT AN INTERVAL OF ONE YEAR

(Johnson)

	Boys		Girls		Total	
Age	12	13	12	13	12	13
N	31		44		75	
S.D.	9.96	12.15	9.26	9.55	9.57	10.77
Age	13	14	13	14	13	14
N	46		56		102	
S.D.	12.60	15.50	12.45	11.90	12.53	13.73
Age	14	15	14	15	14	15
N	62		69		131	
S.D.	10.65	14.35	10.74	13.70	10.70	14.00
Age	15	16	15	16	15	16
N	41		66		107	
S.D.	16.15	15.60	11.95	15.40.	13.85	15.55
Age	16	17	16	17	16	17
N	28		44		72	
S.D.	10.62	14.05	11.60	14.37	11.24	14.36
Age	17	18	17	18	17	18
N	13		22		35	
S.D.	12.24	13.73	12.28	17.00	12.73	16.15.

[1] *Op. cit.*, p. 123.

ages with the exception of two groups — the girls from thirteen to fourteen, and the boys from fifteen to sixteen. This is valuable evidence, because it represents in each case the actual change in variability of the *same pupils* in a year's time.

Thorndike estimates the ratios of the variabilities of intelligence in Grades VI, IX, XII, first-year college, and the graduate school, to the variability in Grade IX, as .98, 1.00, 1.00, 1.02, and 1.03, respectively. Using his estimate in combination with other data already discussed, we are not likely to be seriously in error in concluding that the variability in intelligence of the general population probably increases during early adolescence, and may continue to do so until near the age of cessation of mental growth; and that any increase at adolescence is likely to be largely a continuation of the divergence of the mental growth curves which began much earlier.

PROBLEMS FOR DISCUSSION

1. The significance of individual differences in intelligence for classification of students in the secondary school.
2. The age of cessation of mental growth.
3. Causes of any variation (lack of constancy) in an adolescent's I.Q. from time to time.
4. The success (or failure) in vocational studies of pupils who are unable to meet the "passing" requirements in certain academic subjects.
5. What special provisions should be made for the gifted student?
6. Creative work by secondary-school pupils: value, kinds, and possibilities and means of stimulating it among bright, normal, and dull students.
7. Discuss: "It is undemocratic to direct students into work that fits the level of their mentality when they prefer work that requires more mental ability."
8. How much should intelligence-test scores influence a teacher in class grading?

9. Limitations upon the use of mental-ability tests in high school.
10. What is meant by quantitative and qualitative differences in courses of study?
11. To what extent should differences in the mathematics, English, science, and history courses for bright and dull pupils be quantitative or qualitative? Why?
12. Should high-school students ever be told their scores on intelligence tests? Why? Should they ever be told their relative standings on intelligence tests? If so, when?
13. What is the relation of achievement to degree of intelligence? What factors determine achievement?
14. Discuss: Students whose I.Q.'s are less than 90 should not be admitted to the secondary school.
15. Discuss: The typical high-school curriculum does not meet the needs and capacities of at least one third of the students.
16. To what extent is retardation in the secondary school due to the mentality of students? What are other important causes?

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CHAPTER VI

PHYSICAL AND MENTAL GROWTH DURING ADOLESCENCE: THEIR CORRELATION AND SIGNIFICANCE

ALTHOUGH the coördination of the various physical, mental, moral, emotional, and other traits is an important problem of adolescent personality, and is discussed in Chapter XIV, where its treatment properly belongs, yet such questions as the following ones on the correlation and significance of adolescent mental and physical growth follow logically the four immediately preceding chapters and should be considered at this time.

What is the relation of mental development to physical growth at adolescence? How does the adolescent of superior mental endowment compare physically with others of the same age, but of less mental ability? Is the bright fifteen-year-old, for example, likely to be above, at, or below the average fifteen-year-old in physical vigor and development? Is there some general maturity factor which is significant for both mental and physical growth, as well as for other kinds of development? If so, is there a relatively simple unique index of maturity which gives the key to understanding the complex problems of the many-sided development of adolescents? What is the significance of the relation between mental and physical development for both prediction and control (or direction) of adolescent growth and behavior? What is its significance for classification and promotion in the secondary school? What is the effect of early pubescence upon mental and physical growth? Of late pubescence?

1. *Current views of the relation between mental and physical growth*

Compensation a popular view. The doctrine of compensation is widely accepted, and is used both for comfort and inference, as we see presently. Many persons believe that mentally gifted children are small and weak, and that the superior intellect of the bright boy is in striking contrast with the superior physique of the boy of average intelligence. The great thinker, the man of eminent intellect, is often thought of as lacking in some other desirable trait, as having a countenance "sicklied o'er with the pale cast of thought"; whereas robust physical vigor is associated with the man of average intelligence. Note the common phrases — "slow but sure," "haste makes waste" — or the belief that "the bright child usually doesn't turn out as well as the average child," or views of similar import, which any one may hear repeatedly, if he but watch for them.

It is a comforting doctrine, receiving some sanction from the notion that "nature is just." If I am deficient in some desirable trait, the lack *per se* is evidence that I possess an abundance of some other trait equally commendable. I may infer the presence of one desirable habit or trait from the absence of another; for example, if I am very quick-tempered, I am also, let us say, very kind-hearted. According to this view, the great thinker is impractical, a theorist, or in poor health. Popular fancy and the cartoonists often picture the righteous man as anæmic and of an unhappy, sour disposition.

If this doctrine is really a law of human nature and development; if many desirable traits bear an inverse relation to other equally desirable ones, so that he who has much of one has little of another; can we escape the logical conclusion of "an equality in mediocrity"? Scientific investigation of the problems of human nature gives little evidence of the

inverse relation between mental and physical development implied by the doctrine of compensation, as we see in a later section of this chapter. We do not find high negative correlations between significant physical traits and important mental abilities when accurate, valid measures of both are obtained.

Two scientific views. Two theories of the factors conditioning achievement and adjustment held by students of human nature should be noted. First, is the view that the achievement of an individual is determined by the cooperation of native aptitude and some combination of various mental, physical, emotional, moral, and other traits — innate ability really setting the maximum possible limit of attainment, the other factors contributing to the actual accomplishment. According to this view, these other traits have a specific influence upon achievement, which varies in amount according to the individual and the trait in question. The important problem, according to this theory, is the control and the relative contribution of each factor to the total.

The second theory places great emphasis upon certain more or less general factors which, while working simultaneously, yet probably exert a differential influence in determining the individual's social, intellectual, and mechanical intelligence, his ambition, endurance, emotional stability, etc. This view is expressed in many ways, with varied emphasis upon the importance of different sorts of maturity. Some physical trait or physiological age is frequently regarded as a reliable measure of general maturity.

Thus Naccarati and Lewy-Guinsberg[1] suggest "the hypothesis . . . that the same hormones which promote the morphogenesis of the skeleton and muscles of the limbs, promote also the development of the psycho-motor and

[1] *Journal of Applied Psychology*, vol. 6, pp. 221–34.

psychosensory centers, and would lead to the conclusion that there exists a correlation between the morphological development and the intelligence of the individual."

In 1910 Rotch [1] observed that "where there is delayed mental development, the development of the epiphyses and carpal bones corresponds more to that of the brain than to the general physical condition."

The two following quotations are typical of the view that physical maturity (anatomical or physiological age) has a great determining influence upon the individual's power of adjustment.

In his *Brightness and Dullness in Children* (pp. 117–18), Woodrow says: "We have already seen that mental ability varies with anatomical and physiological age. . . . It is clear that a high degree of brightness goes hand in hand with physical development."

More recently Baldwin,[2] who did so much work investigating the physical development of children, stated his views as follows:

> Physiological age is, the writer believes, directly correlated with stages of mental maturation. The physiologically more mature child has different attitudes, different types of emotions, different interests, than the child who is physically younger though of the same chronological age. . . .
>
> Physiological age has a direct bearing on pedagogical age, as many of our schools are beginning to recognize. The larger and physiologically more mature child may be able to do certain types of school work better, although of inferior ability in specific traits which have been greatly emphasized by school curricula. No child should be promoted or demoted without taking into consideration his or her physiological age. Girls may be expected to progress more rapidly than boys.

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[1] *American Physical Education Review*, vol. 15, pp. 396–420.

[2] *Physical Growth from Birth to Maturity*, pp. 196 f. See also *Twenty-Third Yearbook of the National Society for the Study of Education*, Part I, pp. 25–47.

There should be a direct relationship between physiological age and the age at which boys and girls enter industrial work. . . .

According to this second view, an important problem is the accurate determination of a reliable index of general maturity.

We must examine the evidence supporting these two conflicting views, because the truth is of considerable practical importance; but, before doing so, let us turn aside for the moment and state briefly what is meant by the various "ages" or maturities to which reference is made.

2. *Kinds of maturities or "ages"*

Many kinds of maturities. There seems to be scarcely any limit to the variety of ages or maturities which may be used to describe the development of a human being. At least seven are found in current educational and psychological writings.

1. *Chronological age.* The meaning of chronological age, but not necessarily its true significance for growth, is too well known to require any explanation now. It is used widely by law and custom in such diverse matters as entrance to and compulsory attendance upon school, work permits, suffrage, marriage, consent, life insurance, military service, and old-age pensions. Undoubtedly its significance for the child's growth and development has often been overestimated.

2. *Anatomical age* refers to the stage of growth of bodily structures, and is indicated by such anatomical traits as ossification of the wrist bones, height, weight, chest girth, etc.

3. *Physiological age* refers to progress in the development of bodily functions, as indicated by lung capacity, strength of various muscles, pubescence, voice changes, rate of heart beat, and the like. Sometimes anatomical development is included under physiological age or physical age, but physical

maturity really includes both physiological and anatomical traits.

4. *Mental age* means mental ability or maturity, as measured by various mental tests such as individual and group intelligence tests.

5. *Social age* or maturity denotes the stage of development of social attitudes, habits and skills — the ability to make adjustments involving other human beings — and is much the same as social intelligence discussed in the preceding chapter. Moral development and religious development are often included under this.

6. *Educational maturity or pedagogical age* refers to scholastic achievement or rate of school progress, and rank therein. It is a composite and frequently is made up of many school-subject "ages," such as reading "age," arithmetic "age," etc.

7. *Emotional maturity*, as the name suggests, denotes the rate and position in the development of emotional responses, especially of certain kinds of emotional stability.

3. *Evidence on the relation between mental and physical development*

A vast amount of evidence has been accumulating on the relation of mental to physical traits; so great, in fact, that we have space for scarcely more than a bare outline of much of it, and must omit other parts altogether. We have selected and presented the parts which are most valid and significant, so that the conclusions derived therefrom will be clearly those which the reader would draw if all of the evidence were included.

In general, physical traits are indifferently related to mental traits. If we use the former as a general maturity-index from which to infer the latter, our estimates would be almost as inaccurate as mere guesses.

Table 16. Summary of Representative Studies of the Relation Between Physical and Mental Traits, Made in the United States from 1893 to 1923

(Gates)

Note: Studies marked (?) are probably invalid because certain factors have not been controlled. The criterion of scholastic and mental ability frequently has been unsatisfactory.

Investigation	Date	Subjects Used	Physical Traits Measured	Criteria of Mental or Scholastic Ability	Results
Porter	1893	School children	Height, weight	School grade reached	Positive correlation(?)
Gilbert	1894	School children	Height, weight, lung capacity, strength of grip	Teachers' estimates of mental ability	Zero correlation
Boas	1897	School children	Height, weight	Teachers' estimates of mental ability	Slightly negative or zero correlation
Binet and Vaschide	1897	French School children	Speed of running, reaction time, speed of tapping, strength	Tests of memory and learning ability	Zero correlation
Smedley	1900	School children	Height, weight, sitting height, lung capacity, strength	School grade reached	Positive correlation(?)
Wissler	1901	Men in Columbia College	Height, weight, strength, speed of tapping, steadiness, etc.	Tests of memory, perception, association, etc.	Negative correlation
Bagley	1901	School children	Strength of grip, speed of tapping, accuracy and steadiness of motor control	Teachers' estimates of mental ability	Slightly negative correlation

TABLE 16 (*continued*)

INVESTIGATION	DATE	SUBJECTS USED	PHYSICAL TRAITS MEASURED	CRITERIA OF MENTAL OR SCHOLASTIC ABILITY	RESULTS
Chamberlain	1901	School children	Height, weight, lung capacity, strength	School grade reached	Small positive correlation(?)
Pearson and Lee	1903	College students	Weight, strength	School marks	Zero correlation
Crampton	1908	School children	Weight, strength, pubescence	School grade reached	Positive correlation(?)
Cornell	1908	School children	School physical record, physical defects	School grade reached	Positive correlation, physical efficiency and grade reached(?)
Rotch	1910	School children	Degree of ossification of wrist bones	Teachers' estimates and grade reached	No detailed data, but positive correlation asserted
Foster	1910	School children	Age of onset of pubescence	Grade reached	Positive correlation asserted(?)
DeBusk	1913	School children	Height-weight index, i.e., height ÷ weight	Binet intelligence test	Small positive correlation
King	1914	School children	Age of pubescence	Grade reached	Positive correlation(?)
Baldwin	1914	School children	Height, weight, lung capacity, strength, etc.	Grade reached	Positive correlation(?)

TABLE 16 (*continued*)

INVESTIGATION	DATE	SUBJECTS USED	PHYSICAL TRAITS MEASURED	CRITERIA OF MENTAL OR SCHOLASTIC ABILITY	RESULTS
Woolley and Fisher	1914	Working children	Height, weight, grip, lung capacity, steadiness, sensory acuity	Grade reached on leaving school	Positive correlation(?)
Stewart	1916	Elementary and high-school boys	Height, weight	School marks	Small positive and zero correlations
Bickersteth	1917	Elementary and high-school pupils	Tapping, plunger, steadiness of motor control	Tests of memory, perception, association, etc.	Very low positive correlation
Hunt, Lincoln, and Johnson	1921	Groups of normal and undernourished children	Height-weight index	Tests of intelligence, learning tests, performance tests	Zero correlation with intelligence, small positive correlation with learning, zero correlation with performance tests
Naccarati and Lewy-Guinsberg	1922	College students	Ratio weight to height	Group intelligence tests	Correlations of 0.13, 0.15 and 0.44
Dowd	1922	Normal and underweight children	Weight-height index	Intelligence tests	No difference between average I.Q.'s of the two groups

TABLE 16 (*continued*)

INVESTIGATION	DATE	SUBJECTS USED	PHYSICAL TRAITS MEASURED	CRITERIA OF MENTAL OR SCHOLASTIC ABILITY	RESULTS
Lowell and Woodrow	1922	School children	Ossification of wrist bones, number of teeth	Binet test	Ossification and I.Q., r's = 0.23, 0.15, 0.41, 0.31. Teeth and I.Q., r's = 0.12, and 0.21. Ossification and teeth, r's = 0.22 and 0.29
Baldwin and Stecher	1922	Forty-nine school children, ages 5–15 years	Height, weight, ossification of wrist bones	Binet test	Height and M.A., age constant, r = 0.53. Weight and M.A., age constant, r = − 0.15. X-ray and M.A., age constant, r = 0.09
Nicholls	1923	School children	Normal and underweight groups	Various mental and motor tests	Both groups the same in mental tests. Normal weight had greater muscular endurance
Stalnaker	1923	College students School children	Height-weight indices	Intelligence tests, specific mental tests	Correlations positive but rarely above + 0.10
Murdock and Sullivan	1923	School children	Weight, height, diameter of head	Intelligence tests	Positive correlations, r's from 0.10 to 0.22

Outline summary of evidence from 1893 to 1923. Gates [1] has made an excellent analysis and tabular summary of investigations made in the United States from 1893 to 1923. (See Table 16.)

In many of these studies the correlation method was not used, so that the degree of relationship between physical and mental status is unknown; but where this method has been employed, and fairly adequate criteria of mental and physical traits have been used, the correlations are so low that, with three or four exceptions, they may be regarded as approximately zero. Baldwin's coefficient of .53 between Binet mental age and height for constant chronological age [2] is the highest of the list. Its significance for prediction is not very great, as we see in a succeeding section.

The results of recent investigations. More recently other evidence has been accumulating. Freeman and Carter [3] studied the ossification ratios [4] and mental ages of twenty boys and twenty girls of each age from five to seventeen. Their results suggest that chronological age may be a slightly better index of mental age than is the ossification ratio.[5] When the effect of chronological age is rendered

[1] *Teachers College Record*, vol. 25, pp. 229 ff.

[2] To know the true correlation between height and mental age, we must "partial" out or eliminate any correlation between them which is due to chronological age. The partial coefficient really tells us the relation we would be likely to find if we took pupils of the same chronological age and correlated height and mental age. This is a highly desirable statistical procedure, the use of which will prevent wrong interpretations of interrelationships.

[3] *Journal of Educational Psychology*, vol. 15, pp. 257–70.

[4] By ossification ratio is meant the ratio of the ossified area of the wrist bones (as shown by radiographs) to the area of a certain "carpal quadrilateral." The ratio is used to eliminate the influence of differences in general size of skeleton.

[5] The correlations were as follows: Between mental age and ossification ratio .73 for boys and .75 for girls; between mental age and chronological age .82 for boys and .83 for girls.

constant by the partial correlation technique, mental age and ossification ratio have little relation to each other (r = .084 for boys and .088 for girls).

Gates's [1] results are in essential agreement with those of Freeman and Carter. Ossification ratio, height, weight, chest girth, lung capacity, grip, and nutrition of fifty-eight junior-primary and fifty-seven fourth-grade pupils of the Horace Mann School showed very low positive correlations with mental age and educational achievement (all of them less than .20); the multiple correlation of mental age with these seven physical measures was only .21 — a coefficient whose predictive value is but 2 per cent better than guessing.

Similarly, Prescott [2] found anatomical index (ratio of ossification of wrist bones) and mental age correlating .12 and .30, respectively, for sixty boys and seventy-six girls, between ages nine and eighteen, chronological age rendered constant by the partial correlation technique.

The author [3] found no evidence of a close, positive relation between either mental or educational maturity and physical development in the case of more than eleven hundred individuals of chronological ages from thirteen to twenty years (third-year junior-high-school pupils, college freshmen, and normal-school juniors). The correlations in the case of the junior-high-school pupils (see Tables 17 and 18) and also in the case of college freshmen and normal-school students (*op. cit.*, pp. 233–35) averaged nearly zero at each age, being, on the whole, very low positive and, accordingly, in agreement with the findings of other recent investigations.[4]

[1] *Journal of Educational Psychology*, vol. 15, pp. 329–58.

[2] *The Determination of Anatomical Age in School Children and Its Relation to Mental Development*, p. 46.

[3] "The Organization of Mental and Physical Traits during Adolescence"; in *Journal of Applied Psychology*, vol. 12, pp. 228–41.

[4] See also the report of Landis, Burt, and Nichols on "The Relation between Physical Efficiency and Intelligence" of college freshmen, in *Amer-*

TABLE 17. THE CORRELATION (PEARSON) BETWEEN MENTAL AGE ON THE MCCALL MULTIMENTAL SCALE AND HEIGHT AND WEIGHT OF 138 THIRD-YEAR JUNIOR-HIGH-SCHOOL PUPILS, CHRONOLOGICAL AGES, THIRTEEN TO SIXTEEN

	BOYS	GIRLS
Number of pupils	73	65
r (mental age and height)	−.029	.155
r (mental age and weight)	−.108	.099
Partial correlation, chronological age constant:		
r (mental age and height)	.029	.174
r (mental age and weight)	−.070	.252

TABLE 18. CORRELATION (PEARSON) BETWEEN HEIGHT, WEIGHT, AND THE MEAN OF MENTAL AGES ON THE ILLINOIS AND NATIONAL INTELLIGENCE TESTS OF 149 THIRD-YEAR JUNIOR-HIGH-SCHOOL PUPILS, AGES THIRTEEN TO SIXTEEN

	BOYS	GIRLS
Number of pupils	51	98
r (mean mental age and height)	.266	−.099
r (mean mental age and weight)	.127	.030
Partial correlation, chronological age constant:		
r (mean mental age and height)	.260	−.025
r (mean mental age and weight)	.228	.121

4. *Significance of the relation between physical and mental traits*

Two important problems arise from the discussion in the preceding section: (1) The significance of the physical maturity of adolescents for predicting their mental or scholastic maturity. (2) The consequent value of physical traits for classifying, instructing, and promoting students in the secondary school. In a later section we must also examine the concept of physical maturity in the light of present research,

ican Physical Education Review, vol. 28, pp. 220–21. Intelligence-test scores correlated from −.03 to .07 with the 100-yard dash, running broad jump, baseball throw, and fence climb.

and try not only to see its meaning and import but also to evaluate some of the proposed indices of it as well.

Since so many data involve correlations, we digress at this point to give some suggestions on interpreting them.

The coefficient of correlation. The coefficient of correlation is a numerical expression of the degree of relationship between two traits and may vary from perfect positive (+1.00) through zero (.00) to perfect negative (−1.00). Perfect positive correlation means that each individual of a group has the same ranks on the two traits; that is, that the pupil ranking first on the one trait ranks first on the other trait; that the pupil ranking second on the one trait ranks second on the other; and so on for the entire group. Perfect negative correlation means just the opposite. The pupil ranking first on one thing ranks last on the other; the pupil ranking second on the one thing ranks next to last on the other; and so on for the entire group. The relationship is completely inverse. Zero correlation means that the pupil ranking first on the one trait may rank first, tenth, or even last on the other, and that the pupil ranking second on the one trait may rank twelfth, fifteenth, or third on the other; that is, that there is no relationship between the two traits.

All of these facts about correlation are generally known, but other important considerations are not so well known.

The coefficient of alienation. To those students of psychology and education who have had little or no statistical training, and who regard a coefficient of correlation of .50 between two traits as evidence that they are closely interrelated, it probably comes as a surprise to learn that estimating one of the traits from a knowledge of the other is, under this condition, in the long run, just 13.4 per cent more accurate than mere guessing; yet this is true. Omitting for the sake of brevity certain statistical considerations, the pertinent facts are as follows:

If we knew absolutely nothing about the ability of each student in a group, but had reason to believe the group an average one, and wanted to estimate the ability of each student, our best estimate would be to guess each one at the average. Our error of estimate would then be a minimum and would be the standard deviation of the abilities of the group. If, however, we knew something about each individual's ability, we could estimate it more accurately than if we did not have such knowledge, and the error of our estimates [1] would be less than before. The more we knew about each individual's ability the greater would be the precision of our estimate and the smaller its error. Absolutely accurate knowledge of the ability of each individual in the group would enable us to assign ratings having an error of estimate of zero.

Knowledge of the correlation between two traits enables us to judge the amount of one of them from the amount of the other, the higher the correlation the greater the precision of our judgments. If the correlation is .00, neither trait can be used to determine the amount of the other; but, if it is 1.00, we can judge accurately the amounts of the one thing from the amounts of the other. A correlation of .60 does not mean, however, that an estimate based upon it would be 60 per cent as accurate as one based upon perfect knowledge, nor that it would be twice as accurate as when the correlation is .30. The relation is not rectilinear; the accuracy of estimate does not vary directly as the coefficient of correlation. It is a curvilinear relation; the precision of

[1] The error of estimate for a group is the square root of the mean of the squares of all the individual errors of estimate and is found empirically as follows: (1) Find the difference between each student's true score and his estimated score; these are individual errors of estimate. (2) Square the individual errors of estimate. (3) Find the sum of all these squares. (4) Divide this sum of these squares by the number of students in the group. (5) Extract the square root of the quotient found in 4.

estimate varies as the square root of "one minus the square of the coefficient of correlation," as shown by the coefficient of alienation.

The coefficient of alienation (represented by k) is given by the formula, $k_{12} = \sqrt{1 - r^2_{12}}$, in which "$r_{12}$" is the correlation between the two traits, abilities, scores, or marks which are indicated by the subscripts, 1 and 2. Let us examine the equation of the formula. Squaring and transposing, we have $k^2 + r^2 = 1$, an expression which students of algebra recognize as the equation of the circle.

The coefficient of alienation expresses, as a decimal, the ratio of the error of estimate based upon a given correlation to the error from mere guessing, as already described. Thus, if r (math. and Latin) = .50

$$\begin{aligned} k &= \sqrt{1. - .50^2} \\ &= \sqrt{1. - .25} \\ &= \sqrt{.75} \\ &= .866 \end{aligned}$$

This means that, if mathematics and Latin are correlated .50, and we infer students' scores in one study from a knowledge of their scores in the other study, the error of our estimate for the group would be .866 as great as if we merely guessed everybody at the average; that is, it would be decreased from 1.00 to .866, or by 13.4 per cent; this is another way of saying that the accuracy of estimate would be increased 13.4 per cent. A simple rule is: find k, subtract it from 1.00, move the decimal point two places to the right, and the result is the per cent of decrease in error (or increase in the accuracy) of estimate which the given correlation makes possible.

In Fig. 56 is shown the quarter circle lying in the first quadrant from which the coefficient of alienation can be determined roughly for any coefficient of correlation. Coef-

ficients of correlation are measured on the vertical scale (i.e., along the Y-axis), and coefficients of alienation on the

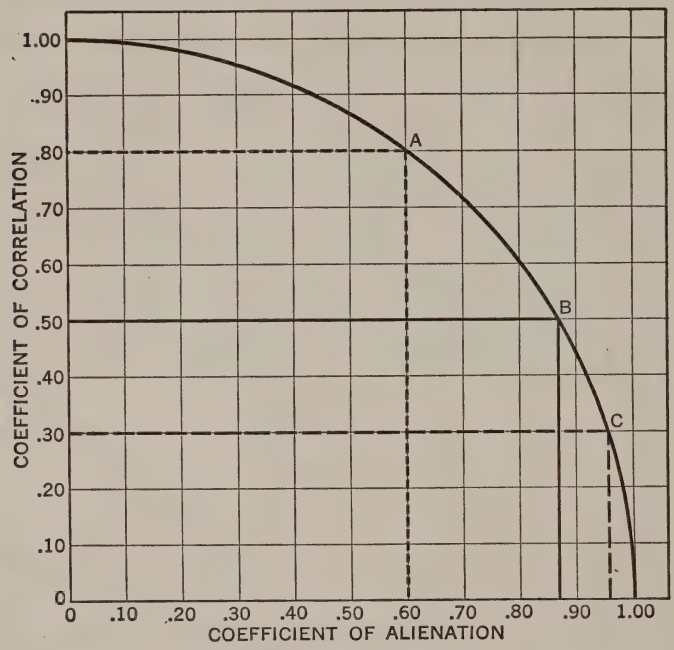

Fig. 56. Correlation-Alienation Chart

horizontal scale (i.e., along the X-axis). In Fig. 56 note, for example, the dotted horizontal line leading from the point $r = .80$ on the Y-axis; follow it until it meets the curve at A, and then follow the dotted line drawn from this point on the curve perpendicular to the X-axis until it meets the latter at the point .60; the alienation coefficient of .60 corresponds to a correlation of .80; $1.00 - .60 = .40$; the error of an estimate based upon a correlation of .80 is 40 per cent less than it is from guessing. Similarly, when $r = .50$, Fig. 56 shows k lying between .85 and .90; probably .87 is

the value which many would assign it by using Fig. 56, whereas calculation shows it to be .866. In like manner, when $r = .30$, $k = .95$, and indicates a 5 per cent decrease in the error of estimate from that of chance. When $r = .60$, $k = .80$, and the error is just 20 per cent less than from guessing.

The coefficient of alienation is, then, very important in determining the significance of a coefficient of correlation for *prognosis*, because it shows us how much better than guessing is the prediction based upon a given coefficient of correlation.

The value of physical traits for prediction. If now we examine the correlations between mental and physical traits shown in Section 3 of this chapter, we find that nearly all of them yield such large coefficients of alienation that predicting mental or scholastic ability from physical traits is only a little more accurate than guesswork. Baldwin's correlation of .53 between height and mental age of forty-nine girls (the effect of chronological-age differences eliminated by partial correlation) is the highest one; it corresponds to an alienation coefficient of .85 and would, in the long run, give estimates 85 per cent as inaccurate as guessing. It seems also to make little difference what age or school year is studied. The data which we have either summarized or presented cover all ages from kindergarten to university. Physical measures thus far are found to correlate so slightly with mental traits that they are practically worthless for predicting either scholarship or mental ability.

We are not denying the importance of knowing the physical condition of adolescents; on the contrary, we believe not only that in all cases of maladjustment in school or home a sound physical and medical examination is the first step in understanding and handling them, but also that adequate knowledge of the physical status of every pupil should be

secured as a routine matter of the secondary school because of its prime importance in the school's helping boys and girls to become strong, healthy men and women. Just now we are considering the value of physical measures as a symptom of mental or scholastic maturity. All the reliable evidence we can find gives little ground for the quotations which assert a significant relation. In fact, it suggests that physical maturity is probably more or less specific and independent of the other two — certainly that its value for predicting them is slight indeed. Further research may indeed show that we may need to replace the concept of "physical maturity" by that of "physical maturities," as we see a little later.

Mental and physical traits not inversely related during adolescence. While investigation does not give warrant for expecting physical measures to be symptomatic of mental or scholastic traits, we must not disregard the fact that the experimental evidence is equally clear and conclusive in giving no support whatever to the popular view that those of great intellectual ability are weak physically. This view has nothing to support it but popular prejudice and the ignorance of superficial observation, although both prejudice and ignorance may keep the belief alive for a long time. If it were true that great minds imply weak bodies, and *vice versa*, then the correlations between mental and physical traits would have to be negative and quite high, say, −.80 or more, with alienation coefficients of .60 or less. Such correlations are shown by no investigation thus far reported. This is very significant. Bright youths are no more likely to be weak or sickly than are the duller ones; in fact the correlation studies seem to show a very slight positive interrelationship between physical and mental status — not close enough, however, to have any value for prediction, but still indicating that the mentally gifted are not weaker physically, but probably are somewhat better developed than the less gifted

ones. Other evidence, better adapted to throw light on this problem, indicates the same thing.

Average physical development of the mentally gifted. Our own data on Freshmen (men) at Johns Hopkins University shows that the top third of seventeen-year-olds on the mental tests average slightly taller and heavier and considerably stronger than the lowest third, but in the eighteen-year-old group of freshmen the differences in these physical measures, while much less than among the seventeen-year-old first-year men, are in favor of the third making the lowest mental-test scores. College freshmen are a selected group, and too much must not be inferred from such data.

The writer divided two hundred and seven third-year junior-high-school students into three groups according to mean mental age on two group intelligence tests,[1] equating the groups as to age, sex, and race, and compared them as to height and weight (see Table 19). At fourteen the difference in height and weight is in favor of the third which is abler mentally; at fifteen it is in favor of the duller boys, and brighter girls, but at both ages the overlapping in height and weight of the first and third tertiles is more significant than the differences between them.

One of the author's students, in a study of one hundred and twenty-five first-year junior-high-school students who were retarded one, two, or three years, found that approximately fifty per cent were above and fifty per cent below the Baldwin-Wood weight-height-age norms. Approximately sixty per cent of those retarded one year were above the norms; approximately fifty per cent of those retarded two years were above the norms; whereas two thirds of those retarded three years were below the norms. Marked over-

[1] The first and third groups were not markedly different in mental ability. Age constant, their mean I.Q.'s differed by amounts ranging from nine to fifteen points (see Table 19).

TABLE 19. THE MEAN HEIGHT AND WEIGHT OF TWO HUNDRED AND SEVEN PUPILS FOURTEEN AND FIFTEEN YEARS OF AGE IN THE THIRD YEAR OF JUNIOR HIGH SCHOOL AND IN THE FIRST AND THIRD TERTILES ON THE MEAN OF INTELLIGENCE QUOTIENTS FROM TWO GROUP INTELLIGENCE TESTS. AGE AND SEX FACTORS CONSTANT. RACE FACTOR VERY NEARLY CONSTANT

AGE 14 N = 48 boys 78 girls	BOYS			GIRLS		
	Mean I.Q.	Height	Weight	Mean I.Q.	Height	Weight
First Tertile...	112	62.3	105.8	115	60.9	107.1
Third Tertile..	101	60.5	101.3	100	60.9	100.0
AGE 15 N = 45 boys 36 girls	BOYS			GIRLS		
	Mean I.Q.	Height	Weight	Mean I.Q.	Height	Weight
First Tertile...	103	62.7	111.1	105	61.3	114.9
Third Tertile..	94	63.4	118.1	92	60.9	106.4

ageness probably implies considerable mental dullness. If it does, then these results indicate that the more stupid pupils were below the norms.

Anthropometric measurements [1] of intellectually gifted children (144 boys and 129 girls of ages twelve to fifteen) show that they excel normal children in height, weight, and breathing capacity at each of these ages as well as at the younger ages, although they also overlap children of normal intelligence so much that these physical measurements are valueless in predicting mental ability.

In a study of approximately 135 children of ages nine to eleven, Hollingworth and Taylor [2] used three groups alike in age, sex, and race, but differing in I.Q. Group I had I.Q.'s above 135 (median 151); Group II had I.Q.'s from 90 to 110

[1] Terman *et al.*, *Genetic Studies of Genius*, vol. 1, pp. 135 ff.

[2] *Twenty-Third Year Book of the National Society for the Study of Education*, Part I, pp. 221–37.

(median 100); Group III had I.Q.'s below 65 (median 43). While the groups overlapped some in height, weight, and strength of grip, Group I clearly excelled Groups II and III, and Group II excelled Group III, giving adequate grounds for the authors' conclusions: (1) that the gifted "are not small and weak," but "tend to be large and also strong," although "intellect cannot be reliably inferred from physical size or grip, nor physical size or grip from intellect, in an individual chosen at random"; and (2) that their data do not suggest "that the superior children are bright *because* they are tall and heavy; nor that they are tall and heavy *because* they are bright. We can only say that mentally gifted children as a group are large and strong at the ages studied insofar as we have measured them."

Value of physical traits for classification and promotion in the secondary school. Since physical traits are so slightly related to mental and scholastic ability, we would not expect them to form a basic criterion for sectioning high-school students according to either intelligence or future educational achievement. There seems to be little warrant, either from careful investigation or from practical school experience, for expecting the taller or heavier boys, for example, to make the top scores in Latin, mathematics, science, and history, and the shorter or lighter ones of the same age to earn all the low marks.

Since the use of physical measures for classification and promotion has been proposed, we should try to see clearly just what use of them may profitably be made.

Teachers in secondary schools are finding that knowledge of a student's physical status is valuable for many problems of instruction, guidance, and control. By common consent the physical well-being (i.e., health education) of the student is placed first in the list of objectives of education; but, as a matter of fact, the actual provisions for physical education

and other parts of the health-education program are inadequate in many schools and are scarcely comparable with the provisions for mathematics, science, or other academic subjects in respect to plant, equipment, teaching staff, and time allotment for effective work. If any students have physical defects, information to that effect is essential for wise direction and control. It may be that remedial physical work is needed. Physical traits also may be considered with profit in adapting the physical-education program to the individual needs of adolescents, since they are of value in classifying for such purposes.

Difficulty of using several bases for classification. A difficult problem of administration confronts the high-school principal at this point. Sectioning students on physical traits does not give groups homogeneous in respect to intellectual ability, scholarship, or social or emotional maturity; neither does sectioning according to valid criteria of mental, scholastic, social, or emotional maturity necessarily provide groups homogeneous in respect to physiological age, anatomical age, or other physical traits. Theoretically, many different bases of classification are desirable in order to secure groups homogeneous in respect to the diverse kinds of maturities. In practice, however, it usually happens that the classification for the academic subjects is used in physical education also. The schedule of classes in many high schools is so complicated that it is almost impossible to section a class upon even a few bases; for example, when a student is assigned to a certain section (say 9B [4]), he is likely to have not only his mathematics, science, etc., in that section, but his physical work as well; the entire class or grade is not likely to be re-sectioned for physical education. Since the subjects other than physical education occupy so much of the school's time and attention, it is not surprising — indeed it is only natural — to find classification for the other

subjects usually dominating the school. We cannot, however, be sure that this *per se* does any serious physical harm to even a small number of pupils, since crucial experimental evidence on it is lacking. Many schools have some flexibility, so that the physical welfare of the student may be secured without sacrificing his scholastic needs.

We want to be clear on this point: the physical welfare of the high-school student is of fundamental importance, and our discussion is not to be interpreted as minimizing it one bit; but its importance is not enhanced by our remaining blind to the fact that the weight of evidence clearly indicates that classification upon the basis of physical measures alone rarely would give sections homogeneous in respect to other important but diverse maturities.

5. *Physiological age; early or late pubescence*

Early maturation has often been looked upon as an evidence of poor health. Sometimes an analogy has been drawn between it and the poor keeping-qualities of early ripening fruit, although the implications of the analogy have necessarily been vague and indefinite. In the light of present knowledge, there seems to be little reason for attaching any sinister import to early pubescence. As we have seen in Chapter III, maturation does not occur at any one chronological age among either boys or girls; in fact, at no one chronological age are as many as fifty per cent of either sex likely to mature. Consequently, the normal age of pubescence is not some one chronological age, but is really a range of three or more years. Individual developmental histories seem to indicate that early maturation is not a sign of poor health, but rather that those who mature earlier are likely to be taller than those of the same age who are not maturing, and that the rate of growth in height is likely to decrease sooner for those maturing early than for those ma-

turing late; and, to a certain extent, the same thing probably holds true for weight also.

The relation of pubescence to mental growth. We have seen, in the preceding chapter, that pubescence is not characterized by a spurt in mental growth, or, at least, by any significant increase in rate. We have data indicating that the physiological age (measured by number of years since first menstruation) of women normal-school students bears little relation to intellectual and scholastic ability.[1] If pubescence does affect mental growth, its influence is temporary, since no evidence of it is seen at ages sixteen to twenty.

The effect of puberty præcox upon mental, social, and emotional maturity. But even more significant information is available from the Yale Psycho-Clinic on two cases of puberty præcox reported by Gesell.[2] Two girls began to menstruate at the age of three years, six months, and eight years, three months, respectively. Various psychometric tests were given and clinical observations made, so that a great quantity of reliable, pertinent data is at hand.

J. B. (Case no. 1), who matured sexually at the chronological age of three and one half years, was observed and tested at ages four, five, six, and seven years. The essential features of her physical, mental, scholastic, and social development are well known (Table 20). In her case pubescence occurred ten years earlier than with the average girl, and was marked by rapid growth in height, weight, strength of grip, digit recall, and ability on the Knox cube test; but her general mental development was normal. Her play interests and social development were those of the average child of her chronological age. At the age of seven she seemed to have no self-consciousness, and showed no special interest in the opposite sex.

[1] *Op. cit.*, pp. 234–35.

[2] *Twenty-Seventh Yearbook of the National Society for the Study of Education*, Part I, pp. 399–409.

TABLE 20. APPROXIMATE DEVELOPMENTAL AGE-LEVELS IN YEARS, REACHED BY J. B. AT CHRONOLOGICAL AGES FOUR, FIVE, SIX, AND SEVEN YEARS

(Gesell)

DEVELOPMENTAL ITEMS	CHRONOLOGICAL AGE AT EXAMINATIONS			
	4 yrs.	5 yrs.	6 yrs.	7 yrs
Height	5.5	7	...	10
Weight	7.5	9.5	...	11.5
Grip (right hand)	6	...	...	11
Carpal Ossification	6	4	6	7
Drawing	4	4.5	5.5	7
Drawing a man	3.5	4	6	6
Language and Vocabulary	3.5	4	5.5	6
Digit Recall and Knox Cube Test	4	4	7	10
Number Sense	3.5	4	5.5	6
Play Interests	4	5	6	7
School Report	...	...	Ave.	Ave.
Reading	...	...	6	7.5
General developmental level	3.5	4	5.5	6.5

B. E. (Case no. 2) reached puberty five years before the average age for girls. She was given mental examinations at chronological ages six, eight, ten, and eleven years. Her approximate developmental age-levels at these years were 2.25, 2.75, 3.5, and 3.5 years, respectively. Her mental development was consistently that of an imbecile with a developmental quotient between 30 and 35. When tested at the age of 5 years, 9 months, height and weight were at the five-year level. When retested at the age of ten years, two months, height was normal, but weight was that of a fourteen-year-old girl. At the age of eleven her affective and social reactions were inferior to those of a normal child three years old.

Gesell's comment on the two cases and their bearings on the relation of pubescence to mental maturation is quite significant, lending support to the view that maturity is specific rather than general. He says:[1]

[1] *Op. cit.*, pp. 408–09.

If pubescence has an essential dynamic relation to the maturation of general intelligence, marked cases of puberty præcox should show a measurable deviation of the usual curve of mental growth. So far as we may generalize on the basis of the two cases before us, we can conclude that precocious displacement of pubescence does not carry with it a coördinate deviation in the cycle of mental growth. Such precocity may apparently alter psychic patterns and introduce affective alterations in the attitudes and in the temperamental susceptibilities. There may even be an unusual increment in the sphere of social development, but there is no corresponding increment in the sphere of mental ability. The changes concern personality as contrasted with intellectual factors; and even these changes are not proportionate to their physiological occasion.

A psycho-clinical study of individual cases of puberty præcox confirms the dynamic importance of the endocrine complex in the determination of behavior. It does not, however, warrant the view which has been advanced that the whole period of growth may be regarded as a function of sexual development and differentiation. There is a high degree of specificity, even of independence, in the components of the growth complex. Pubescence plays its part, but not with unlimited autocracy.

The nervous system, among all the organs of the body, manifests a high degree of autonomy, in spite of its great impressionability. It is remarkably resistant to adversity, even to malnutrition. This relative invulnerability gives it a certain stability in the somatic competition between the organ systems. *It tends to grow in obedience to the inborn determiners, whether saddled with handicap or favored with opportunity.* For some such biological reason, the general course of mental maturation is only slightly perturbed by the precocious onset of pubescence.

Numerous case studies by the writer's students indicate that high-school pupils who are accelerated in physiological development may also excel somewhat in social development, being supported by results from other investigations.[1]

[1] See, for example, Abernathy, Ethel M., "Correlations in Physical and Mental Growth"; in *Journal of Educational Psychology*, vol. 16, pp. 458–66, 539–46. Miss Abernathy's results also show that although the I.Q. of a group of physiologically retarded high-school girls is the same as that of a

The relation of pubescence to athletic ability. In a study of the athletic ability of more than nine thousand high-school girls, Atkinson [1] investigated the effect of physiological age upon scores in six athletic tests for girls of each age from fourteen to eighteen. She concludes [2] that:

> Physiological age does not seem to be a determining factor . . . that in three of the events — the hop, step, and jump, the basket-ball throw, and basket-ball goal shooting — the best record was made by the girls who matured at seventeen years (N = 86, 36, and 18). In the potato race, the best record was made by those maturing at thirteen and fourteen (N = 128), with second place held by a group of girls (N = 12) maturing at seventeen. In the fifty-yard dash the first place was held by a group of girls (N = 11) who matured at twelve and second place, by an immature group (N = 13) at sixteen years of age. In the rope climb the highest record was made by a small group (N = 28) which matured at twelve. It is thus seen that developmental extremes mark the best performances.

For further analysis we present some of Miss Atkinson's data in Figs. 57 to 59. Disregarding results for all groups of less than twenty-five, we call the reader's attention to the following items: in the hop, step, and jump, early pubescence seems to imply lower scores at each age from fourteen to eighteen; e.g., of the girls fourteen years of age those maturing at twelve made the poorest scores, those maturing at thirteen came next, those maturing at fourteen were next, whereas those who were still immature made the best scores. The curves show a probably negative relation between physiological age and this sort of athletic ability. In the fifty-yard dash (see Fig. 59) and rope climb, early maturation seems to be negatively related to ability (with one exception — rope climb among fourteen-year-old girls). In

physiologically accelerated group, yet the school progress of the latter group is much better than that of the girls who matured two or more years later than girls usually do.

[1] *American Physical Education Review*, vol. 30, pp. 389–99.

[2] *Ibid.*, p. 395.

the basket-ball throw (see Fig. 58) and in goal shooting, the relation appears to be slightly positive at ages fourteen to sixteen, but slightly negative in the basket-ball throw for girls seventeen and eighteen years of age. Among seventeen-year-old girls, physiological age may bear a slight posi-

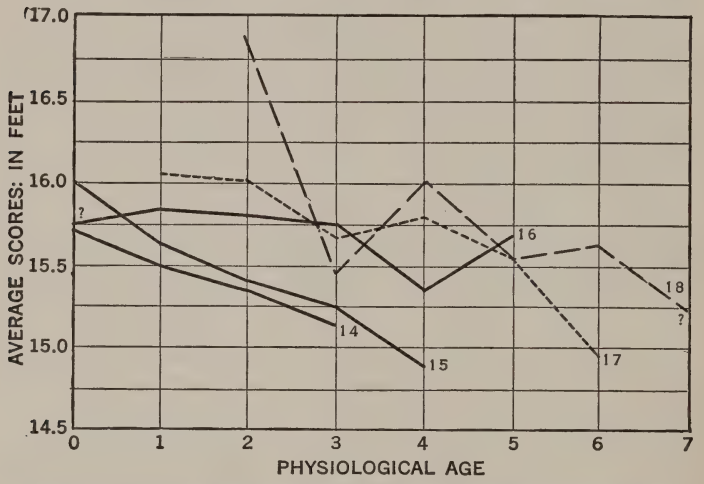

FIG. 57. RELATION OF PHYSIOLOGICAL AGE TO THE SCORES OF 7185 HIGH-SCHOOL GIRLS, AGES FOURTEEN TO EIGHTEEN, ON THE HOP-STEP-AND-JUMP

(From Atkinson's data.)

? means less than twenty-five girls in the age-group making that score at that physiological age.

Note to Figs. 57, 58, 59: To study the effect of physiological age upon the score in any athletic test, it is necessary to compare records of girls of the same chronological age, but of different physiological ages. Accordingly, in each of the three following figures, follow each age-line through the various physiological ages, noting the scores of girls who are of the same life-age, but who are different in physiological age. Thus in Fig. 57, the curve for girls who were fourteen years old indicates that those who were immature made better scores than the fourteen-year-old girls who matured during their fourteenth year, and they in turn made better scores than the fourteen-year-olds who matured at thirteen; the poorest scores made by the girls fourteen years old were made by those who matured sometime during their twelfth year.

tive relation to goal shooting, but at eighteen the relation probably is neutral. In the potato race, the relation is probably mixed.

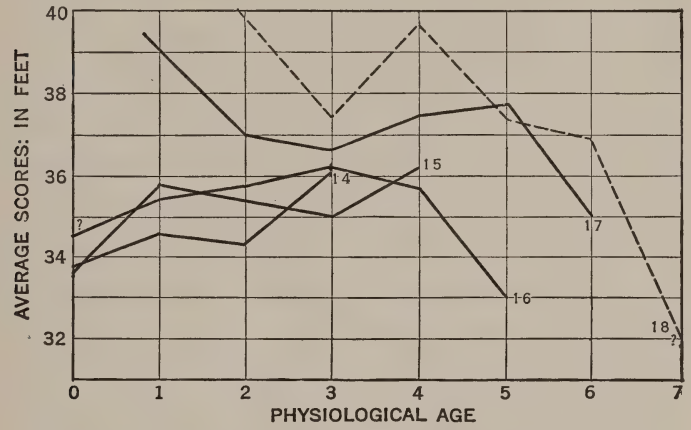

FIG. 58. RELATION OF PHYSIOLOGICAL AGE TO THE SCORES OF 5846 HIGH-SCHOOL GIRLS, AGES FOURTEEN TO EIGHTEEN, ON THE BASKETBALL THROW

(From Atkinson's data.)

? means less than twenty-five girls in the age-group of that physiological age making that score. See also note on page 162.

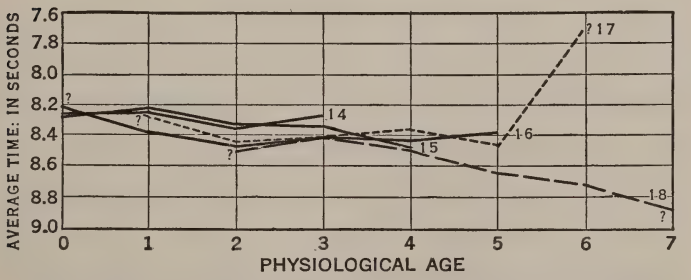

FIG. 59. RELATION OF PHYSIOLOGICAL AGE TO SCORES ON THE FIFTY-YARD DASH IN THE CASE OF 4005 HIGH-SCHOOL GIRLS, AGES FOURTEEN TO EIGHTEEN

(From Atkinson's data.)

? means less than twenty-five girls of that age in the group making that score at that physiological age. See also note on page 162.

These athletic tests involve the strength and coördination of the larger muscles, and we must not infer from the results too much about motor skill which depends upon the coordination of the smaller muscles; but even with this limitation they compel us to question the significance of physiological age for entrance upon industrial work, at least to the extent of keeping the question open until evidence has been reported showing the degree of "relationship between physiological age and the age at which boys and girls [should] enter industry." Especially does it seem pertinent to question the preceding assumption since Woolley [1] has shown that both boys and girls, who left school at fourteen to go to work, did develop normally physically and seemed to show no physical ill-effects from their industrial employment. Giving youth a chance during the teens to profit by schooling really suited to his particular needs, and protecting him against unsuitable working conditions during his years of rapid physical growth, seem to be more practical ways of conserving his health and promoting his general efficiency.

Apparently, then, pubescence has vastly more significance for its biological function, for certain secondary sex characteristics, and for rate of growth in size and weight than it has as a symptom of growth in strength or motor skill. Its import for social hygiene is, of course, important. Pubescence undoubtedly has some effect upon the emotional life of the youth, even though adequate objective evidence may thus far be lacking. Common observation by students of human nature has led to the belief that puberty introduces some emotional changes, even though their appearance may not be so sudden nor their nature so chaotic as was formerly believed.

[1] *An Experimental Study of Children.*

6. *Physical maturity or "maturities"*

No one index of general maturity. We have seen that the evidence gives little reason for believing in a general unitary maturity, since research has not yet disclosed any one index highly symptomatic of such diverse groups of traits as physical, educational, mental, social, and emotional maturities, and the like. If we want to know the mental or other capacities of the adolescent, we must apply measuring instruments specifically designed to appraise significant samples of each. Accepting the conclusion that no general unitary maturity has yet been found, and that, at present, the prospects of finding any unique symptom of such a maturity are remote, the reader may inquire if each of the maturities, referred to above, is, in itself, general or specific; whether, for example, we should think of a general physical maturity or several more or less specific ones. If a general physical maturity exists, what is the index or criterion according to which it may be estimated with fair accuracy?

All physical traits not closely correlated. Apparently, no one physical measurement can be used as an accurate index of an individual's status in all other physical traits, for the simple reason that not one of them uniformly correlates closely enough with each of the others during adolescence or childhood. We must hasten to add, however, that physical traits usually intercorrelate positively, and that between some of them the relationship is often quite close. In fact, the high positive association often found between certain traits, such as weight and chest girth of both sexes from thirteen to seventeen, or between height and weight from thirteen to fifteen, is in sharp contrast with the correlations between other traits such as height or breathing capacity and strength of arm or back, which average much lower. As samples of the available evidence that some physical traits are closely and positively related to others, but that no one

TABLE 21. THE INTERCORRELATIONS OF HEIGHT AND WEIGHT OF GIRLS

(Brooks)

AGE	N	r HEIGHT AND WEIGHT	AGE	N	r HEIGHT AND WEIGHT
10	20	.835	12	46	.717
12	20	.845	14	46	.704
11	57	.739	13	29	.887
13	57	.797	15	29	.804
Mean		.791			

TABLE 22. MEAN CORRELATIONS BETWEEN CERTAIN PHYSICAL TRAITS FOR AGES THIRTEEN TO FIFTEEN, AND AGES SIXTEEN AND SEVENTEEN

(From Baldwin, 1920)

N = approximately 50 to 60 of each sex at each age

	AGES 13, 14, 15		AGES 16, 17	
	Boys	Girls	Boys	Girls
Height — weight	.821	.618	.674	.517
Height — breathing capacity	.776	.716	.596	.722
Height — sitting height	.902	.892	.802	.803
Height — chest girth	.671	.426	.593	.367
Height — strength R. arm	.607	.504	.448	.332
Height — strength L. arm	.593	.416	.405	.190
Height — strength upper back	.513	.546	.249	.377
Weight — breathing capacity	.764	.489	.680	.493
Weight — sitting height	.804	.622	.683	.511
Weight — chest girth	.883	.892	.848	.858
Weight — strength R. arm	.715	.562	.628	.399
Weight — strength L. arm	.668	.441	.603	.300
Weight — strength upper back	.654	.462	.451	.425
Breathing capacity — sitting height	.787	.691	.632	.671
Breathing capacity — chest girth	.722	.507	.669	.441
Breathing capacity — strength R. arm	.642	.400	.471	.291
Breathing capacity — strength L. arm	.633	.366	.424	.183
Breathing capacity — strength upper back	.567	.417	.396	.240
Strength R. and L. arm	.830	.829	.851	.656

trait is highly symptomatic of all others, we present Tables 21 and 22.[1]

In the case of height and weight our data on unselected Baltimore public-school girls corroborate Baldwin's results for Horace Mann girls.

Height and weight closely related during adolescence. Height and weight thus seem not only to be significantly related at the adolescent ages, but also to possess positive predictive value for each other after an interval of one, two, or more years, even during the time of rapid adolescent growth. Any trait is likely to be more closely related to itself a year or more later than it will be to some other trait after the same interval. Compare, for example, Tables 23 and 24 in which the average correlation of height with weight and of weight with height after intervals of one and two years is .76, and the average coefficient of height with height and of weight with weight after the same intervals is .93. One or two years of growth in the early teens do not greatly modify the relative ranks in height and weight, suggesting a constancy of rank in these physical traits quite similar to that for relative mental ability found by Garrison, Rugg, Terman, and others who have studied this feature of the I.Q.[2]

[1] In the case of kindergarten and fourth-grade children of the Horace Mann School, Gates (*Journal of Educational Psychology*, vol. 15, p. 339) found the intercorrelations of seven physical traits (ossification of wrist bones, height, weight, chest girth, lung capacity, strength of grip, and nutrition) ranging from .11 to .83. The mean correlations of height, weight, and chest girth with the other traits were .47, .56, and .51, respectively.

See also Terman, *et al.*, *Genetic Studies of Genius*, vol. 1, pp. 153 ff., for data on the interrelations of certain physical measurements among gifted children. The correlations range from .49 to .85 for adolescents (i.e., children aged thirteen or fourteen years).

Burlage (*American Journal of Physiology*, vol. 64, pp. 252–84) reports pulse rate correlating −.26 and −.29 with height and weight, respectively for nearly nine hundred high-school girls; systolic and diastolic blood pressure correlated around .50 with height and weight.

[2] See also Baldwin, *op. cit.*, p. 142. Height at nine and ten correlated

TABLE 23. THE CORRELATION OF HEIGHT AND WEIGHT AT INTERVALS OF ONE AND TWO YEARS IN THE CASE OF GIRLS, AGES TEN TO FIFTEEN YEARS

Correlation between	N	r
Height at 10 and Weight at 11	20	.828
Height at 10 and Weight at 12	20	.879
Height at 11 and Weight at 12	77	.775
Height at 11 and Weight at 13	57	.778
Height at 12 and Weight at 13	103	.786
Height at 12 and Weight at 14	46	.745
Height at 13 and Weight at 14	75	.777
Height at 13 and Weight at 15	29	.866
Height at 14 and Weight at 15	29	.827
Weight at 10 and Height at 11	20	.736
Weight at 10 and Height at 12	20	.719
Weight at 11 and Height at 12	77	.728
Weight at 11 and Height at 13	57	.660
Weight at 12 and Height at 13	103	.713
Weight at 12 and Height at 14	46	.646
Weight at 13 and Height at 14	75	.725
Weight at 13 and Height at 15	29	.753
Weight at 14 and Height at 15	29	.802
Mean correlations:		
Height and Weight 1-year interval		.799
Height and Weight 2-year interval		.817
Weight and Height 1-year interval		.741
Weight and Height 2-year interval		.695

The organization of other physical and motor traits. The interrelationships of other physical and motor capacities vary widely and lend support to the view that some phases of physical and motor maturity are specific rather than general — so much so in fact, that we may need to speak of physical maturities. Thus, Brace [1] used thirty tests to measure a wide range of motor abilities and determined

with height six years later .92 for boys and .72 for girls; weight, .82 for boys and .62 for girls; breathing capacity, .82 and .75, and strength of right arm, .65 and .45, for boys and girls, respectively.

[1] *Measuring Motor Ability.*

TABLE 24. THE CORRELATION OF HEIGHT WITH HEIGHT AND OF WEIGHT WITH WEIGHT AFTER INTERVALS OF ONE AND TWO YEARS IN THE CASE OF GIRLS, AGES TEN TO FIFTEEN YEARS

Correlation between	N	r
Height at 10 and at 11	20	.848
Height at 10 and at 12	20	.909
Height at 11 and at 12	77	.919
Height at 11 and at 13	57	.838
Height at 12 and at 13	103	.943
Height at 12 and at 14	46	.905
Height at 13 and at 14	75	.957
Height at 13 and at 15	29	.891
Height at 14 and at 15	29	.917
Weight at 10 and at 11	20	.985
Weight at 10 and at 12	20	.937
Weight at 11 and at 12	77	.976
Weight at 11 and at 13	57	.942
Weight at 12 and at 13	103	.971
Weight at 12 and at 14	46	.925
Weight at 13 and at 14	75	.974
Weight at 13 and at 15	29	.943
Weight at 14 and at 15	29	.992
Mean correlations:		
Height 1-year interval		.912
Height 2-year interval		.886
Weight 1-year interval		.980
Weight 2-year interval		.937

their relation to many measures of athletic abilities [1] among junior- and senior-high-school pupils and college women. The motor ability tests correlated all the way from .17 to .80 with athletic abilities, approximately .20 with chronological age, and .00 with weight. Physical and motor ability correlated −.15 with intelligence.

[1] Such as pull-up, fence-vault, running high jump, potato race, rope climb, jump and touch, running broad jump, dash (75 and 100 yards), baseball target throw, basketball goal throwing, and achievement tests in indoor baseball, basketball, and indoor soccer football.

7. *The significance of physical development during adolescence*

We have already seen that the physical traits of adolescents have practically no value for predicting mental, scholastic, or other maturity; but that they may be very important in individual diagnosis; and that they are quite significant in adapting various sorts of school programs to individual needs — especially the physical education activities. Since well-balanced, healthful development means so much for the mental and physical well-being of the adolescent, a knowledge of his physical status and of the way he is developing is essential. Defective hearing, defective vision, malnutrition, constitutional disorders, or other significant variations from normal status and development should be observed in the early stages of their incidence, since they may call for special corrective programs or remedial treatment. A careful physical and medical examination is an integral part of the diagnosis and treatment of mental disorders. Both may well play an important part in a program of preventive mental and physical hygiene. Accordingly, a knowledge of the adolescent's physical status can be used for both corrective and preventive work, although the latter ultimately is likely to be of greater importance.

Physical well-being plays an important rôle in the development of personality. Every youth has a right to be healthy, well-developed, and reasonably strong, and this right should be conserved by all the agencies which affect it as they mold or shape his destiny — school, home, vocation, recreation, and the youth himself.

Physical development is of obvious importance for the various occupations demanding muscular strength and motor skill. Certain physical traits have considerable value in predicting some phases of physical development during adolescence, as we saw in the preceding section.

8. *Implications of adolescent mental growth*

Space permits us to point out only a few of the implications of growth of mental ability during adolescence. Upon reflection many others will occur to the thoughtful reader.

Growth of intelligence and the curriculum. The fact that intelligence continues to grow until the late teens or longer is suggestive for arranging courses of study for the different years of the secondary school. Since mental growth after fourteen does not consist in the mere acquisition of "more facts, more knowledge, and wider experience in doing various sorts of things," but, on the contrary, is essentially similar to that which takes place before fourteen, it follows that subject matter should be arranged somewhat in order of difficulty from year to year, so that throughout his high-school career the intellectual challenge to each student will be in proportion to his increasing ability. Providing mere quantity of subject matter is not adapting it to the needs of pupils. Other things being equal, the most difficult topics or subjects should come late in the high-school course.

Of course, other things frequently are not equal, and such factors as the age of leaving high school and the relative importance of certain subjects or topics may outweigh differences in difficulty and render inadvisable a sequence based upon mere order of difficulty. If mental growth ceased at fourteen, most of the qualitative differences in subject matter suggested above would be ill-advised after the second or third year of junior high school. Some fruitful, though difficult research problems on the curriculum of the secondary school concern the best grade-placement of various topics and subjects, and involve a broad, comprehensive criterion to discover the most advantageous grade-location.

Ability grouping. The growth of intelligence during adolescence (as well as increases in certain other kinds of maturity) must be taken into account in adapting instruc-

tion to pupils in the various years of the secondary school.

In schools large enough to divide classes into two or more sections, differences in mental ability in addition to differences in achievement may well be utilized in sectioning, whenever it is administratively feasible to do so, because the range of mental ability of a section is thus reduced and teachers can better adapt instruction to the abilities and needs of students. Since the range of mental ability probably is slightly greater throughout the secondary school than it is in Grade VI, the differentiation of subject matter and any practicable provisions to secure groups homogeneous in intelligence and educational achievement would seem, in certain respects, to be as desirable and helpful for adapting materials and methods of instruction to students' individual needs in high school as for similar adaptation in the upper elementary grades.

Mental ability and previous educational achievement are significant for prediction of scholastic success, as we shall see in Chapter XVII.

Since secondary-school students tend to preserve fairly well their relative intellectual and scholastic ranks from year to year, and since both mental ability and previous scholarship are symptomatic of educational achievement, they should be two of the important factors considered in any scheme of homogeneous grouping.

PROBLEMS FOR DISCUSSION

1. Adaptation of secondary-school work to the needs of the very bright child who is physiologically immature.
2. Need of homogeneous grouping in physical education.
3. Bases of homogeneous grouping for scholarship.
4. How can physiological age be used as a guide in planning physical education?
5. What valid evidence can you find for believing that physiological age is closely and positively related to mental maturity

in the case of students of the same chronological age or of the same year in high school?

6. Significance of physiological age for scholarship in high school.
7. A bright girl of fourteen in good general health but sexually immature was promoted to ninth grade in an 8–4 school system. Her father, a physician, insisted that high school is for adolescents and required her to repeat the eighth grade. Do you think his action wise? Why?
8. The effect of physical development upon the growth of intelligence during adolescence.
9. Traits associated with maturation of boys; with maturation of girls.

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CHAPTER VII

INSTINCTS AND IMPULSES: INDIVIDUAL AND SOCIAL TENDENCIES OF ADOLESCENTS

WHAT is the native equipment of the child? Of what use are his unlearned tendencies? To what extent have they been modified at the beginning of puberty, and what are the possibilities of still further modifying them during the teens? How can they be controlled and redirected in the service of the individual and of society? What are the laws and principles governing their modification? The present chapter and the two which follow it attempt to answer these questions.

The native equipment of the child. The human being's native equipment includes reflexes (simple and complex or compound), emotions, and many loosely fixed, greatly modifiable tendencies known as instincts,[1] as well as the three characteristics of living protoplasm — sensitivity, conductivity, and modifiability or correlation — upon which awareness and learning depend.

1. *The meaning of instinct and impulse*

Reflex and instinct. A sharp distinction between reflex and instinct is not easily drawn. Both are native. A typical reflex, such as the "knee-jerk," is simpler, more definite, more immediate, and much more difficult to modify (if modi-

[1] Some students of human nature deny that man has any "instincts," but believe that he has much instinctive activity which is, of course, modified and becomes an integral part of a very complex whole — the human personality. Others add capacities to the list of innate tendencies, meaning by them very much the same thing as instincts, only more modifiable, more complex, and less definite tendencies.

fiable at all) than a typical instinctive tendency such as manipulation or fighting. Sometimes instinct is regarded as a group of chained reflexes; that is, the stimulus evoking the instinctive response sets off one reflex which in turn is the stimulus that leads to the next reflex, etc., for the entire series.[1] James [2] defines instinct as "the faculty of acting in such a way as to produce certain ends, without foresight of the ends, and without previous education in the performance." For our present purposes we should note that instincts are modifiable, complex, innate tendencies to reactions, aroused by stimuli arising either in an inner bodily condition of the organism or in an external situation. When instinct is defined as an innate pattern-reaction, as being quite like a reflex, the list of human instincts is necessarily brief, and we are likely to find many part reactions or other similar "left-overs." We consider in this chapter not only these more definite pattern-reactions, known as instinct, but also those more loosely organized, greatly modifiable, but clearly unlearned tendencies to response, which are sometimes termed capacities.

Changing conceptions of instinct. The history of psychology, even for the last fifteen or twenty years, shows marked changes in the conception of instinct. Many earlier psychologists regarded it as a mysterious entity, an all-powerful something that made an individual do this or that, sometimes whether he wished to or not. This view still persists in some quarters, despite the considerations which have recently been adduced to show its inadequacy. According to widespread popular belief, instinct is regarded as if it were a persistent, powerful, definite, complex, closely-organized, almost entirely unmodifiable, innate, "behavior-

[1] Cf. Warren, *Human Psychology*, chap. 6; and Watson, *Psychology from the Standpoint of a Behaviorist*, chap. 6.

[2] *Principles of Psychology*, vol. II, p. 383.

pattern" which determines much of the adult's conduct. Earlier formulations emphasized an awe-inspiring biological significance, postulated an instinct of "self-preservation," and grouped as an instinct other almost equally heterogeneous activities.

We do not have space, nor is it appropriate to this volume, to discuss these earlier views at any length. They are treated fully in the literature [1] on the subject. Accordingly, we are content to note briefly that the views on the nature of instinct have been greatly modified in recent years, and that psychological thought, although by no means in agreement on this subject, tends now to regard instincts as much more specific and more modifiable behavior-patterns or stimulus-response units of behavior than it formerly did. Present psychological thought, influenced by psychiatry and the recent developments in child psychology, emphasizes the modification of instinctive tendencies from earliest infancy, and holds that at puberty, for example, many instinctive tendencies, if observable at all, are largely submerged under the learned or acquired elements. Emphasis has been shifted from the fixed character and unchanging power of instincts to the great possibilities of redirecting and changing them.

The point of view of many psychiatrists is set forth by Campbell [2] who says of the sex instinct:

> The complexity of a concrete case, such as a wayward adolescent, is often impossible to formulate in terms of any disordered balance of a group of instincts. One is forced to admit that while in the total complexity one can trace here and there certain familiar elements, such as anger reactions, self-assertion, etc., there is a large residual which cannot be thus analyzed. The concept of instinct

[1] See references at the end of this chapter. Tolman gives an extensive review of the views of different writers, and appends an excellent bibliography covering the controversial aspects of instinct.

[2] *Journal of Abnormal and Social Psychology*, vol. 16, p. 244.

only carries us a short distance in the analysis of the case, unless one is willing to indulge in speculative formulations.

Nature of impulse. When the organism is prepared or ready for some act, it is said to be in a state of readiness. When one is about to cough or sneeze, some preparatory activities have already taken place which put him in a state of readiness. Now the adjustments leading to the state of readiness give rise to sensations which, indeed, constitute the conscious impulse. We may then define an impulse as the sensations arising from the bodily condition of the organism when it is in a state of readiness. On the "behavior" side the impulse might be regarded as the preparatory adjustments leading to the state of readiness.

Relation of instinct to impulse. All instinctive tendencies involve impulses. According to James,[1] "Every instinct is an impulse." An analysis of complex instincts reveals two common characteristics, viz., the bodily state of readiness and the impulses already described. The impulsive character of instincts is important, making them, according to many psychologists, drives to action. Although human motives and impulsions are largely derived from instincts, yet some of them are due to habit — not alone to habits based directly upon or derived from instincts, but to other habits only very indirectly derived from the native tendencies.

2. Classification of instincts

Nearly every psychologist uses some basis for classifying instincts, and formulates a list of classes to which he assigns the various instinctive tendencies. With all the work that has been done upon the subject, however, there is less agreement upon the classes into which they should be divided than upon the basis for classification. The reader is referred to

[1] *Op. cit.*, vol. II, p. 385.

the references appended at the end of the chapter for an introduction to the literature on the subject, since our treatment must of necessity be brief.

Classification according to purpose. Instincts have been classified upon a teleological basis, by noting the "purpose" or end they are assumed to serve. Some earlier classifications included just two instincts — self-preservation and reproduction; others comprised destructiveness, constructiveness, and lists of adaptive, regulative, and other instincts. At the present time such groupings are not highly regarded by most psychologists, although one finds instincts divided into ego, herd, and sex, corresponding, respectively, to self-preservation and self-aggrandizement, tribal preservation, and race preservation. The objections to such groupings are as follows: first, they are too broad; one instinct includes several behavior units whose integration certainly is not inborn; second, one may question the value of assuming that their constituent activities serve a definitely useful or adaptive purpose.

Classification of instincts according to situation and response. Many believe that instincts may be more advantageously classified according to the situations evoking them, or according to the responses. A thorough-going division upon either of these bases is difficult, because of the complexity of human behavior and of the conditions under which it is manifested. We have used Gates's [1] classification, with a few changes. Instincts are grouped according to the kinds of stimuli arousing them, but the names of the various ones usually refer to the impulses or responses. A few of the tendencies might be placed in two groups instead of one.

1. *Responses to bodily or organic conditions.* Breathing, drinking, eating, responses to heat and cold, resting, sleeping, and voiding.

[1] *Psychology for Students of Education,* chap. 7.

2. *Responses to objects or events in the environment.* Avoiding reactions, fighting, gross bodily activities such as walking and climbing, manipulation, mastery or self-assertion, submission, and vocalization.

3. *Responses to the presence or activities of other persons.* Avoidance of scorn, desire for social approval, gregariousness, mating behavior, and parental behavior.

To the second group some would add overcoming obstructions, exploration, curiosity, collecting and hoarding, and probably a few other tendencies; whereas the behaviorists and those students of human nature who would discard the term "instinct" and use some term like "inherited behavior-pattern" or "drive," would omit several from our list (e.g., mastery and submission, avoidance of scorn, and the desire for social approval) upon the ground that they are learned — are habituations rather than innate tendencies. The question of whether all these tendencies are or are not inborn in the human infant need not detain us now. We are sure that long before adolescence the innate elements of most of them have been greatly modified by experience and training. Then too, the problems of predicting and controlling adolescent behavior relate primarily to the permanence of adolescent trends and to the possibilities and means of their further modification.

3. *Instinctive tendencies during adolescence*

Wide variety of tendencies observed among adolescents. The tendencies observed during the teens are partly innate, or are built upon inborn tendencies. They are integral constituents of the youth's personality. The instinctive components have been greatly modified since early infancy, and so many acquired elements have been consolidated with them that the native part seems to be but a small fraction of the observed total. Our present knowledge of human

nature indicates clearly that instincts are not the fixed, unalterable entities postulated by an earlier psychology, and that what we refer to as instinctive tendencies at adolescence are developments and modifications of much simpler, less inclusive, innate behavior-patterns. Whether one regards instincts as inborn, or as almost entirely habits, we believe that the tendencies which we have called instinctive have been greatly modified and integrated through experience, although the exact proportion of native and acquired elements during the teens is unknown. In the following discussion we have used the conventional names for instinctive tendencies present during adolescence; but it should be remembered that large portions of them are due to modifications by the environment.

Responses to bodily or organic conditions. The instinctive responses to the organic needs of the organism are the most definite, permanent, and fully organized of the child's innate equipment. They are present throughout life and are utilized to form habits in the interests of general physical health. They need no further discussion since their value and control are so generally known and provided for.

Responses to objects and events in the environment: Avoiding reactions. Avoiding reactions include at the one extreme definite well-fixed responses, such as winking, sneezing, coughing, spitting, and the sudden withdrawal of hand or foot when hurt. Some of these activities may be classed as reflexes. They include at the other extreme dodging, shrinking, cowering, hiding, fleeing, standing still, and other more modifiable responses evoked by situations which arouse the emotional response of fear. By the time of puberty the more alterable tendencies have been modified and consolidated into habit-systems almost as much as they are ever likely to be. Development usually proceeds in such fashion that many specific situations which originally called

them out no longer do so, and other situations do evoke them.

Fighting. The stimulus which arouses the activities of fighting is interference with an activity already under way; rage or anger is the emotion closely associated with it. There is evidence from observation of boys — especially of their life in gangs — which leads us to believe that fighting is stimulated not only by interference with the progress of some activity, but also by the conditions which set off the tendencies to mastery and self-assertion. The latter cases may, of course, be regarded as forms of thwarting or interference, as may also pugnacious behavior aroused through jealousy or rivalry, especially in matters relating to sex.

Mark Twain's description of Tom Sawyer's fight with the new boy illustrates the fact that conditions affecting mastery and self-assertion may evoke pugnacious behavior. The large proportion of acquired response elements is also noteworthy.

> Presently Tom checked his whistle. A stranger was before him — a boy a shade larger than himself; well dressed. . . . He had a citified air about him that ate into Tom's vitals. The more Tom stared at the splendid marvel, the higher he turned up his nose at his finery and the shabbier and shabbier his own outfit seemed to him to grow. Neither boy spoke. If one moved, the other moved — but only sidewise, in a circle; they kept face to face and eye to eye all the time. Finally Tom said:
>
> "I can lick you!"
>
> "I'd like to see you try it."
>
> "Well, I can do it."
>
> "No you can't, either." ,
>
> "Yes I can."
>
> "No you can't."
>
> "I can."
>
> "You can't."
>
> "Can!"
>
> "Can't!"
>
> An uncomfortable pause. Then Tom said:

"What's your name?"

"'Tisn't any of your business, maybe."

"Well, I 'low I'll *make* it my business."

"Well, why don't you?"

"If you say much, I will."

"Much — much — *much*. There now."

"Oh, you think you're mighty smart, don't you? I could lick you with one hand tied behind me, if I wanted to."

"Well, why don't you *do* it? You *say* you can do it."

"Well, I *will*, if you fool with me."

"Oh, yes — I've seen whole families in the same fix."

"Smarty! You think you're *some*, now, *don't* you? Oh, what a hat!"

"You can lump that hat if you don't like it. I dare you to knock it off — and anybody that'll take a dare will suck eggs."

"You're a liar!"

"You're another!"

"You're a fighting liar and dasn't take it up."

"Aw — take a walk!"

"Say — if you give me much more of your sass I'll take and bounce a rock off'n your head."

"Oh, of *course*, you will."

"Well, I *will*."

"Well, why don't you *do* it then? What do you keep *saying* you will for? Why don't you *do* it? It's because you're afraid."

"I *ain't* afraid."

"You are."

"I ain't."

"You are."

Another pause, and more eyeing and sidling around each other. Presently they were shoulder to shoulder. Tom said:

"Get away from here!"

"Go away yourself!"

"I won't."

"*I* won't either."

So they stood, each with a foot placed at an angle as a brace, and both shoving with might and main, and glowering at each other with hate. But neither could get an advantage. After struggling till both were hot and flushed, each relaxed his strain with watchful caution, and Tom said:

"You're a coward and a pup. I'll tell my big brother on you, and

he can thrash you with his little finger, and I'll make him do it, too."

"What do I care for your big brother? I've got a brother that's bigger than he is — and what's more, he can throw him over that fence, too." (Both brothers were imaginary.)

"That's a lie."

"*Your* saying so don't make it so."

Tom drew a line in the dust with his big toe, and said:

"I dare you to step over that, and I'll lick you till you can't stand up. Anybody that'll take a dare will steal sheep."

The new boy stepped over promptly, and said:

"Now you said you'd do it, now let's see you do it."

"Don't you crowd me now; you better look out."

"Well, you *said* you'd do it — why don't you do it?"

"By jingo! for two cents I *will* do it."

The new boy took two broad coppers out of his pocket and held them out with derision. Tom struck them to the ground. In an instant both boys were rolling and tumbling in the dirt, gripped together like cats; and for the space of a minute they tugged and tore at each other's hair and clothes, punched and scratched each other's noses, and covered themselves with dust and glory. Presently the confusion took form and through the fog of battle Tom appeared, seated astride the new boy, and pounding him with his fists.

"Holler 'nuff!" said he.

The boy only struggled to free himself. He was crying — mainly from rage.

"Holler 'nuff!" — and the pounding went on.

At last the stranger got out a smothered "'Nuff!" and Tom let him up and said:

"Now that'll learn you. Better look out who you're fooling with next time."[1]

Social pressure operates to prevent physical combat. The adolescent is less likely to engage in fisticuffs than when he was ten or eleven years old. He has learned to adjust himself to situations without resorting to much fighting. Through close association with other boys he has found a working basis for his companionship, and has become habituated to the give and take which it involves. If he is a

[1] Clemens, S. L.: *The Adventures of Tom Sawyer*, pp. 7–10.

member of a gang, he may continue to participate in inter-gang fights throughout the teens. Normally, however, the boy does most of his fighting before the teens.

Even though social pressure may secure the inhibition of actual fighting activities, the impulse may remain and manifest itself in ways less condemned socially. The youth may resort to cutting remarks, angry looks, or other ways of showing his pugnacious impulses. Thus a clique of girls in a sixth grade had snubbed and otherwise mistreated another girl whom they disliked. The occasion for dislike probably would have provoked a fight, had the girls been boys. In discussing the matter, the principal tried to get them to see the unkindness they had shown. Thoroughly impressed and much disturbed by her own part in the affair, one girl said falteringly, "But I didn't say anything to her"; to which another girl replied, "Yes, but you can *look* things."

The form in which pugnacity manifests itself may be quite undesirable and require considerable redirection, yet the impulses undoubtedly contribute important elements to human character, such, for example, as aggressiveness and persistence. Accordingly, redirection and positive utilization of these strong impulses are preferable to attempts at mere inhibition or prevention. Suitable substitute activities, especially vigorous, competitive, athletic games, are valuable: witness the results of the physical-education and athletic programs of the urban agencies dealing successfully with boys' gangs.[1]

Among boys, fighting may serve a useful purpose. It is not necessarily wholly undesirable. Disputes may arise of such a nature that the best thing is for the boys to settle the matter themselves, as suggested by the following case:

Two twelve-year-old boys were fighting just off the school ground immediately after the close of the afternoon session. They were

[1] See Thrasher, *The Gang.*

brought to the office and questioned by the principal. Merl said Arthur had called his sister some vile names and must apologize. Arthur said he had not called her any names. The next day other boys were questioned, but none of them knew how the trouble had started. Merl and Arthur had been trying for three days to get together and have it out; but staying in after school, parents calling to take one of them some place, and other events had prevented their doing so. After sifting the matter carefully, the principal found that no one knew the truth of the matter except the two boys.

What should he do? Merl had a reputation of telling the truth regardless of consequences to himself, and was a clean-cut, straightforward, manly chap, who wanted very badly to fight. Arthur had the reputation of being an inveterate liar. But the principal did not know which boy was telling the truth this time. He was sure, however, that fighting about school could not be countenanced. He advised the boys to that effect and explained why. He told them he didn't know which one was telling the truth, but that they probably did, and they would have to settle it themselves. Then turning to the one boy, he said, "Now, Arthur, if you didn't call Merl's sister those names you're not much of a boy if you don't defend yourself and give him a whipping for accusing you of something you didn't do." Turning next to the other boy, he said, "Merl, if you're absolutely sure Arthur called your sister those names, you're not much of a boy, if you don't give him a thrashing and make him apologize. But remember, no fighting about the school. It causes too much excitement and disturbance."

On the following Saturday afternoon, Merl, lying in wait not far from Arthur's home, met up with him and gave him a sound thrashing. Arthur admitted he had called the names and apologized. Each boy told the principal about it the following Monday — Merl voluntarily, Arthur upon being asked; and both accounts were essentially the same. The matter was settled.

Did the principal pursue the right course?

Gross bodily activities: walking, climbing, and other physical activities. Development along the lines of these tendencies continues until maturity, as we saw in Chapters II and III, although a child's interest in climbing is usually greater before the teens. Physical activity normally continues to appeal to youth all through adolescence. Girls

often show some disinclination to it after puberty, probably partly on account of social pressure which frowns on such "unladylike" activities. Where physical activities for girls are socially approved, we usually find many girls taking part in vigorous sports, such as tennis, track, indoor baseball, swimming, hockey, basketball, rowing, etc.

Gross bodily efficiency increases up to maturity, but soon wanes. The baseball player or professional boxer is at his best in the early twenties, is "old" by thirty, and usually retires by the time he is thirty-five or forty.

Interest in physical activities can be utilized in many ways to further the general health and happiness of the adolescent.

Manipulation. The impulse to manipulate is innate. It involves tendencies which are sometimes regarded as a form of curiosity, exploration, and inventiveness. It is basic to the acquisition of many kinds of skill. It appears first very shortly after birth, and continues with greater or less strength through childhood and adolescence into adult life. During childhood its great strength is a matter of common observation, as any teacher and most parents will testify. A great variety of objects evokes it. As the child grows older and has broader experience, many objects which formerly stimulated manipulative responses no longer do so; greater familiarity with them and other factors have decreased their stimulating power, but other objects continue to exert a strong or even stronger stimulating influence. At first, just mere manipulation is highly satisfying; but after some experience with various sorts of objects, handling them reveals different degrees of satisfyingness. A selective process is operative. We see the beginnings of individual interests and of their narrowing. Yet mere manipulation is likely to prove satisfying, apart from its consolidation into various acts of skill.

Mastery or self-assertion. Child, adolescent, and adult all find satisfaction in dominating people and things. Self-assertion is an almost universal trait among children, appearing very early and persisting, with modifications, throughout life. Rivalry and emulation may be regarded as forms of it. Leadership and force of personality are built upon it. Woodworth distinguishes four forms of self-assertion — the aggressive and defensive responses to people and things. Thus he notes: (1) the success motive in defensive reactions to things, such as overcoming obstructions and accomplishing undertakings; (2) the desire for power manifested by aggressive reactions — not merely overcoming obstructions offered by things but positively seeking for things to master; (3) the independence motive in resisting domination by persons; and (4) the desire to dominate — not merely resisting domination by others but aggressively seeking to dominate or master them.

Self-assertion and independence are often said to be concomitants of maturation, and therefore, peculiarly adolescent traits. That these tendencies normally do become stronger during the teens cannot be doubted by any one well acquainted with adolescent boys and girls; that sexual maturing is a factor in increasing their strength seems also to be unquestionably true; but we have no reason for believing that self-assertion is a new trait which appears at puberty. All the evidence is to the contrary. We have data from observing children at various ages, especially from observing and reobserving the same group of children for several years, which indicate what thoughtful parents and teachers have known all along, viz., that self-assertion is a childhood trait whose modification and socialization is a difficult problem. Kindergarten and primary teachers have to modify and redirect this trait among children from four to eight years old. Yet, it is undoubtedly true that independ-

ence normally increases with age, especially as the child acquires ability to control various elements of his environment, being greatly reënforced at adolescence by maturation. Usually, the circumstances surrounding the child foster an increase in independence, self-assertion, and self-reliance, as he gets older; he is given greater freedom and placed more on his own responsibility. In any event, these traits should be stronger among adolescents than among pre-adolescents. Accordingly, methods of control and methods of instruction adapted to younger children are not suited to adolescents.

As we shall see elsewhere,[1] parents are often unwittingly derelict because they try to curb the youth's spirit of independence by making discipline stricter at puberty than during childhood; and the result is that they either interfere with the proper development of this important trait, or cause the child to break with them, or to deceive them. The socialization of this trait is one of the difficult but highly important tasks of moral education.

Submission. Submissive behavior is the opposite of mastery. It is probably innate and, under certain circumstances, satisfying. If a situation clearly is one which cannot be mastered, submissiveness is a probable response, and a valuable asset for adaptation as well. When confronted by a difficult task, one often feels an impulse to give up, to cease trying; and giving up often does bring relief. We should note at this point, however, that individual differences play an important rôle. If giving up means failure to attain a cherished goal, it may be more annoying than continuing the struggle. Knowledge of one's powers enables the individual to avoid useless persistence and fruitless striving. The great danger is that submission may be developed at the expense of mastery and independence, and may become an

[1] Chapter VIII, section 7.

"easy way" out of situations which the individual could successfully meet, if he would but put forth reasonable effort.

Vocalization. Vocalization is a native tendency. It is early manifested in the baby's cheerful babbling and cooing, but is soon modified to form the child's speech habits. At an early age the instinctive tendencies have been so greatly overlaid with the acquisitions from training that they are a good illustration of the great modifiability and modification of instincts in early childhood.

Responses to other human beings. The "social" instincts are largely habits acquired through experience. Some students of human nature insist that they are not instincts at all, but are merely acquired tendencies to reactions. We have grouped them among the innate tendencies, although we are inclined to believe that the innate elements are greatly submerged under the acquired. For example, we believe that avoidance of scorn and desire for social approval are largely acquired through experience, since "people" control the child's environment from earliest infancy, withholding and bestowing objects and acts which satisfy and annoy. The present trend of psychological thought is to emphasize the habitual and to minimize the inborn parts of these two, as well as of the other "social" instincts.

Avoidance of scorn. Whether avoiding scorn is innate or is largely built up through the operation of the law of effect, it certainly is a powerful force in shaping conduct in the teens. The disapproval and scorn of his fellows are distressing to most adolescents. The impulse to avoid the scorn of his companions often conflicts with his impulses to self-assertion. His conduct then depends upon which impulse is dominant. For example, the bully may continue to express his self-assertive tendencies, even in the face of strong dis-

approval by his group; but the desire for social approval is more frequently the stronger impulse, as we see in the succeeding paragraph.

Desire for social approval. The desire for the approval of one's fellows is one of the most powerful forces affecting the adolescent. As we shall see in Chapter XI, the anticipation of social praise or blame is an important level upon which much of human conduct takes place. Children from an early age seek the approval of parents, friends, and teachers. On many matters adolescents care more for the approbation of associates of their own age than they do for the approval of adults. Parents' views often carry less weight with adolescents than do the opinions of their companions.

The desire for social approval manifests itself among boys in attempts to show off before others, in feats of daring, strength, and skill. It continues its force through childhood and adolescence into adult life. The means employed to win approval vary greatly. Attention to clothes and personal appearance may be largely due to this impulse. One may seek approval through achievement in business, politics, profession, society, or sports; by boasting or extravagance, or by drawing attention to relatives or prominent friends and acquaintances. One readily observes this tendency shaping the conduct of adolescents and adults. On the street, in the Pullman smoker, at public gatherings, almost everywhere that two or more people are gathered together, one sees examples of this trait, varying from grossly obvious to subtly concealed attempts to secure the approval of others. The force of public opinion is indeed one of the most powerful means of control. Through social approval and disapproval the group secures conformity to its manners, and customs, and codes of conduct. The very fact that these two tendencies are so strong among adolescents is evidence that they truly are becoming members of the

group, and suggests lines along which effective means of control may be developed.

Gregariousness. Gregariousness is essentially an impulse to be with other human beings. The stimulus of being left alone or of being alone evokes it. The individual normally is uneasy and restless when alone, seeks others, and once with them ceases to be restless. But a child, adolescent, or adult *may* be lonely in a group, if he takes no part in its activities.

How much of gregariousness is innate, and how much learned? We do not know, but we can readily see the manner in which much of these tendencies in the six-year-old, as well as in the sixteen-year-old, might be built up through environmental circumstances. From his earliest infancy, human beings have waited on him to relieve his pain, to appease his hunger, and to provide a multitude of things for his enjoyment. They have been about him constantly, seeking to control and direct his behavior.

Whatever may be the proportions of native and acquired elements, gregariousness is a powerful human tendency whose strength is revealed by the fact that solitary confinement is one of the severest punishments. Occasionally one finds an adolescent who prefers to be alone, but he is the exceptional case and is so unusual that he is regarded unfavorably. Adolescents usually prefer to be with others. Children who do not get along well with other children and who prefer to play alone, are showing an unhealthy developmental trend. Similarly, the moody introspective adolescent, who constantly avoids the presence or companionship of others and always seeks solitude, needs wise care and guidance to overcome such unhealthy tendencies.

Gregariousness brings adolescents into groups, but it does not determine their activity once they are in the group; that is determined by other impulses and by learning. An

important task of adolescent education is to provide suitable opportunities for membership in clubs and other organized groups, and to give wise guidance to their activities so that youth can have the advantages of group loyalty without completely submerging his own individuality and power of independent thought and action beneath group-determined behavior. At the one extreme is the youth who is aloof, self-centered, solitary, and anti-social in his attitudes; at the other, the youth completely dominated by the crowd, accepting as true, just, and right, whatever the crowd thinks is true, just, and right, and doing very little thinking for himself — a creature of the crowd, with little individuality. Between these extremes is the youth who is sensitive to the life of the group, is in sympathy with its activities and welfare, finds great satisfaction in social contacts, but forms his own rational opinions independent of group suggestion, and is individually responsible. Here again we see that native tendencies need direction and control in the service of human welfare.

Mating behavior. There is some evidence that the tendencies grouped under mating behavior are present shortly after birth. They certainly exist during early and later childhood, as any one familiar with these years well knows. They are strongly operative at maturation. They are so strong during the teens that their control in the interests of the individual and society is one of the most difficult and important problems facing the adolescent.

The use of wholesome, vigorous, engrossing activites is commonly recommended as effective in sublimating sex impulses. Some social psychologists and other students of human nature believe that sex impulses cannot be sublimated, that is, cannot be refined and exhalted to such nobler activities as science, religion, art, or charity. Others firmly believe they can be sublimated or redirected. We do know

that sex appetite is aroused at times by thought, imagination, pictures, and other external objects, as well as by the presence and behavior of other persons, especially those of the opposite sex. As a matter of fact, these sorts of sex stimulations are very common among human beings, and are often used to debase and pervert sex impulses. Accordingly, a useful way of avoiding many needless stimulations is to have the adolescent's time and attention fully occupied with wholesome, vigorous, interesting activities.[1]

Much has been said by certain recent writers about the all-pervading power of sex impulses, and the dangers that follow attempts to repress or control them. The assumption is made, consciously or unconsciously, that definitely sexual energy exists in a fixed amount, and therefore that any substitute activities also will be definitely sexual. What little is known about the working of the autonomic nervous system (see Chapter VIII, section 1), and about human energy gives little support to this view.

On this point C. Macfie Campbell [2] of the Harvard Medical School, says:

> To assume that, where a specific sexual activity is repressed, the alternative activities must necessarily be sexual, is not sound. The hungry man, recognizing that no personal efforts will yield any immediate chance of a meal, may, to distract himself, plunge into some interesting study, and while he is engrossed in this the tendency to hunt for food may be temporarily in abeyance. The study, however, is not a nutritive activity, not a sublimated expression of the hunger instinct. While hunting for food he may find himself in danger and all his energy may be mobilized to escape this danger, the hunt for food no longer showing any trace of its activity. Here again the actual activity superseding the earlier one is not to be looked on as a derivative of the hunger instinct, but as an entirely different mode of utilization of the energy and the mechanisms of the individual.

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[1] See also Chapter XVI, section 2, on Social Hygiene.

[2] *Journal of Abnormal and Social Psychology*, vol. 16, pp. 246–47.

Activity of obviously sexual nature may be superseded by other activity without the latter activity showing any specific sexual quality; the energy of the individual, potentially available for sexual activity, may be actually utilized for other purposes. It is true that, in many cases where sexual activity has been repressed, the substitute activity may be definitely modified by the repressed factor, and that its control of the reactive mechanisms of the individual may be only partial, often shows a trace of compromise, and in some cases is only a disguised expression of the apparently repressed trend. In other cases, however, it may utilize all of the energy of the individual, with complete, if temporary, abeyance of any sexual activity.

Parental behavior. Most authorities regard parental behavior (or certainly maternal behavior) as at least partially innate, although the tendency among recent writers is to emphasize the acquired elements. The chief innate elements usually are impulses to protect and care for the young, and to show such tendencies as smiling and patting in the presence of an infant.

New instincts at adolescence. What new instincts appear at adolescence? From the preceding account it becomes quite clear that, with but one possible exception, adolescence really does not show any new instinctive tendencies. The only ones whose appearance before puberty might be questioned are those relating to sex; but ample evidence indicates that they are present before the teens, even though they are so much stronger and so much more difficult to control during adolescence that they are like new and powerful drives.

4. *The utility of instinctive tendencies*

Values of modified instinctive tendencies. Man's instinctive tendencies are an important part of his native equipment. Their utility is due not so much to their being directly adaptive in their original form (although they may

possess some value for this reason) as to their providing a basis for useful modifications and furnishing impulses which are important dynamic elements in human personality. If instinctive tendencies are, as some one has said, a sort of *vis a tergo*, we would expect them to attain their highest value when modified to meet the conditions of life which surround the individual. Looked at in this way, they possess at least seven values which we may note at this time:

1. Instinctive responses to bodily and organic conditions serve the important purely vegetative functions of caring for the intake of food, its digestion, distribution, and assimilation by all parts of the body, and the elimination of waste products, as well as such functions as sleeping, resting, and adaptations to changes of temperature. These tendencies have high, permanent, adaptive, life-conserving value.

2. The sex instinct insures procreation and perpetuation of the race, but requires control to serve the best interests of both the individual and society.

3. Some instinctive responses to objects and events in the environment (avoiding, fighting, self-assertion, submission, etc.) provide the basis for protective and defense reactions. But they too require modification to make them of greatest use. They are, in one sense, the raw materials from which useful protective and defense responses may be fashioned.

4. Other instinctive responses, especially manipulation and various loosely organized part reactions, lie at the basis of occupational activities involving skill. Here again we must note the great development of original nature by experience or training. So great are the changes in innate tendencies and so intricately and completely are native and acquired trends combined that it is impossible to sort out the innate elements by analyzing, for example, an act of skill of a twelve-year-old boy.

5. Such tendencies as vocalization, gregariousness, desire

for social approval, avoidance of scorn, mastery or self-assertion, submission, and fighting are involved in making adaptations to other human beings. By the time puberty is reached the acquired elements form a large part of the total behavior-patterns and are usually very closely integrated with the inborn parts.

6. Instinctive tendencies together with other innate constituents are the basis of differences in human personality. Both the highly organized and the loosely organized, greatly modifiable, innate elements are included.

7. Furthermore, we should note that all instinctive activities, aside from the purely vegetative and procreational, serve the important function of initiating learning.

The functions of instinctive tendencies may be summarized as follows: (1) some of them are directly adaptive, e.g., the vegetative and procreative; (2) when modified, they are basic to many useful, human adaptations; and (3) they initiate learning.

Some instinctive tendencies are not useful apart from the changes which experience makes in them. In fact, the usefulness of many of them under the conditions of modern life really does depend upon what is done with them, or how they are modified and organized to help the individual meet the conditions of his life. This is not at all surprising. They are innate, are not intelligent, and do not imply foresight of consequences or adaptation of means to attain individual ends. In the very nature of the case we do not see how they could have that complexity of organized neuron connections which would make them definitely useful in unmodified form. Probably the chief value of many of them lies in the fact that they can be greatly altered to fit changing conditions of life.

5. *Modification and control of instinctive tendencies*

Knowing what instinctive tendencies are likely to be found among adolescents and knowing their possible utilities, we must next inquire how they may be modified and controlled to serve best the interests of youth and society, because there is a clear need of their redirection and regulation — a need which becomes greater as life becomes more complex.

The control of instinctive tendencies of adolescents. The ways of controlling the instinctive tendencies of adolescents are essentially the same as those which are effective during childhood and the years of maturity. Control consists in two things: first, the inhibition of the response natural to the instinctive tendency; and second, the substitution of some other response for the native one — presumably a more desirable one. Inhibition of a native response may be secured by withholding (or avoiding) the stimulus which originally arouses it — hence the value of studying instincts to know the situations evoking them. Inhibition may be secured also by attaching to the response some annoyance or discomfort by means of direct punishment or some form of social disapproval. Furthermore, the substitution of an approved for a disapproved response is yet a third way of preventing a given reaction. The last of the three methods is to be preferred to either of the others, because it is positive and is more likely really to secure the desired inhibition. The use of punishment or disapproval often is necessary to keep the undesired reaction in abeyance until the desired response can be secured. Substitution is merely a case of conditioning another response, and is discussed in the next topic.

As a general rule, securing the inhibition of a strong native tendency is a very difficult matter; the thwarting of impulses involved in it often leads to other activities; but, since life presents so many situations which cannot be controlled and

which tend to arouse undesirable native responses, it is highly important that youth be trained to inhibit them or to employ suitable substitute activities. For example, many conditions tend to arouse pugnacious behavior and they are likely, even under the most favorable circumstances, to be met throughout life. Adequate preparation for life habituates the youth to meet satisfactorily most of the irritating events without recourse to fighting.

Modification of instinctive behavior of adolescents. Instinctive responses are modified by practice and by maturing, both of these factors leading toward an increase in the perfection of the given native response, a thing in which we are not now interested. We want to consider changes in instinctive tendencies effected by modifying stimulus or response. Accordingly, we may say that modification consists in three things: first, changing the situation; e.g., attaching a different situation to a given response; second, altering the response; e.g., attaching a different response to a given situation; and third, modifying both situation and response. In all three cases we must not forget that what a situation really is at any time depends in part upon the individual experiencing it, and upon his purposes and attitude at the time he experiences it.

One way of attaching a different stimulus to a given response is to present simultaneously two stimuli one of which called out the desired response. Through repeated presentations the second stimulus alone comes to evoke the response originally aroused by the first one. This is the now familiar conditioned response described by Pavlov and others. A situation frequently contains many stimuli tending to secure a given conduct-response, but after many repetitions some of the stimulating elements may be omitted and the response still be secured. If the new or different stimulation leading to a given response is satisfying, the

probability of its persisting is thereby enhanced. In a similar manner, a different response may be attached to a given situation by using reward and punishment, as previously stated.

If the unconditioned response results in great enough annoyance, the child tends to inhibit or modify it. Through language he may know exactly what features of it are undesirable and what sorts of reactions are acceptable. Consequently, he may greatly telescope the purely trial-and-error learning, as found among the animals below man. He may respond readily to suggestion and easily make many modifications; or he may be quite persistent in making the unconditioned response or in trying out responses not suggested to him by others, and thus need a stronger form of punishment or annoyance, and need it more continuously; or he may require only moderate reward or punishment. At any rate, he may try various responses instead of the native one until he hits upon one that is satisfying, or, at least, not annoying. Many repetitions under the influence of reward and punishment are needed to make a response habitual.

By similar processes both situation and response may be changed. Thus pugnacious tendencies, originally aroused by thwarting of some kind and manifested in the native responses of fighting, may be so modified that social injustice is the stimulating situation and vigorous work to relieve it through orderly processes may be the response. The impulses involved in instinctive tendencies become dynamic elements in many of the habits built upon them.[1]

[1] For further discussion of control and modification of native tendencies see Chapter VIII, section 5, and Chapter IX. See also Hunter, "The Modification of Instinct from the Standpoint of Social Psychology"; in *Psychological Review*, vol. 27, pp. 247–69. On the sex instinct at adolescence and its control, see Hollingworth, *Psychology of the Adolescent*, pp. 116–38.

PROBLEMS FOR DISCUSSION

1. The gang spirit at adolescence: values, dangers, utilization in discipline and in curricular and extra-curricular activities.
2. Need of directing the social tendencies of adolescents.
3. The growth of social ideals from childhood to adolescence.
4. Social maladjustments during adolescence.
5. What are some of the positive methods of socializing the individual who is inclined to be non-social?
6. Utilization of the adolescent's self-assertion by the secondary school.
7. Advantages and disadvantages of segregating boys and girls in home rooms in senior high schools.
8. Discuss: The social demands of the adolescent are nothing more than those which naturally come with the advance in years and greater experience.
9. What can teachers and parents do to help self-conscious children?
10. Discuss: The adolescent years are a period of restless activity.
11. Secret societies in the high school.
12. What can be done to help promote wholesome social relations among secondary-school pupils?
13. How can home and school meet the adolescent's desire for adventure?
14. Evaluate the evidence indicating that there are instincts.
15. Contrast the earlier and later views of the meaning of instinct.
16. The educational value of self-esteem.
17. The extent, causes, and control of bullying among high-school boys.
18. How does the gang develop anti-social attitudes?
19. What should school authorities do in cases of sex delinquency among students?
20. Coeducation in high school and college.

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CHAPTER VIII

THE EMOTIONAL LIFE OF THE ADOLESCENT

1. *Nature of the emotions* [1]

WHAT is meant by emotion? In what ways does an emotion differ from an instinct? Of what value are emotions?

Meaning of emotion. The term, emotion, is used loosely to refer to a wide variety of bodily and mental states. Impulses are commonly regarded as emotions, and many people mean impulses when they speak of emotions. They confuse the two states through failure to observe the difference between "wanting to do something" and feeling some way about something. Woodworth's definition is useful. He holds [2] that "an emotion is a conscious stirred-up state of the organism." Gates [3] defines it as a complex of sensations resulting from a rather profound and widespread bodily response, "involving particularly the visceral and glandular mechanisms."

The stirred-up condition of the organism in some strong emotion, such as fear, grief, or anger, is a matter of common observation. Many signs of the emotional disturbance are

[1] Our account of the general psychology of the emotions necessarily is brief. For fuller treatment consult such books as the following: Cannon, *Bodily Changes in Pain, Hunger, Fear, and Rage*; Carr, *Psychology*; Crile, *The Origin and Nature of the Emotions*; Gates, *Psychology for Students of Education*; Gault and Howard, *Outline of Psychology*; James, *Principles of Psychology*, vol. II; *McDougall, Introduction to Social Psychology*; Moore, *Dynamic Psychology*; Thorndike, *Educational Psychology, Briefer Course*; Warren, *Human Psychology*; Watson, *Psychology from the Standpoint of a Behaviorist*; Woodworth, *Psychology*; and other standard works on General Psychology.

[2] Woodworth, *Psychology*, p. 119.

[3] *Psychology for Students of Education*, p. 158.

open to external observation; we note the tense muscles, harsh loud voice, clenched fists, and heavy hard breathing in anger, and the corresponding manifestations of other strong emotional states. Considerable evidence has been accumulated showing that fear, anger, and other similar states involve marked changes in the internal condition of the organism. Experiments upon dogs and cats, for example, have shown that anger stops the normal course of the digestive processes. If a dog is greatly angered (for example, by the presence of a cat in the same room), the flow of gastric juice is largely stopped, and may be only 15 or 20 per cent of what it was immediately before he became enraged. A few minutes after the excitement has passed the flow of gastric juice increases and is soon back to normal. Other experiments, using the X-ray, show that, if a cat is angered shortly after a meal, the normal, rhythmic, churning movements of its stomach stop, and the flow of gastric juice is greatly diminished. Here too, several minutes must elapse, after the cause of the excitement has been removed, before the digestive processes become normal.

In human beings strong emotions likewise produce marked internal changes. In fear or anger the heart beats more rapidly and with greater strength; the large veins of the trunk are contracted, forcing blood back to the heart, restricting the amount which reaches the digestive and other internal organs of the trunk, and thus making larger amounts available for the skeletal muscles, brain, lungs, and skin. Both the rate and the depth of breathing increase. The adrenal glands, activated by fibers from the middle division of the autonomic nervous system (as presently described), pour out larger amounts of adrenalin which in turn produces a significant series of coöperating effects. In addition to decreasing the digestive activities and reducing the size of the large blood vessels of the abdomen, adrenalin stimulates the

heart and lungs. It facilitates greater aëration of the blood by causing the tiny smooth muscles of the lungs to dilate. It increases the sensitivity of the skeletal muscles, rendering them less subject to fatigue. It stimulates the liver to discharge into the blood larger amounts of glycogen, the fuel needed by the muscles for their probably greater exertion. Thus anger or fear decreases the activities of digestion at the same time that it stimulates the nervous and glandular mechanisms to activate heart, lungs, liver, and striped muscles; and with the result that the skeletal muscles are provided blood in larger amounts and richer in fuel for muscular work at the same time that their strength and endurance are increased.

The nerves controlling the internal emotional responses. The internal changes involved in emotional responses are under the control of the autonomic nervous system.[1] The autonomic system consists of ganglia (collections of nerve cells) giving rise to axons [2] which end in the tissue of various glands, the heart-muscle, walls of the blood vessels, and in other smooth muscle tissues of the body. The autonomic is not independent of the central nervous system, as the name might imply; on the contrary, it is under the control of the latter. Outgoing axons (motor fibers) from the spinal cord and brain-stem discharge impulses through synapses [3] into the dendrites [4] of the neurons of the autonomic system.

[1] For a full account of the autonomic nervous system and its functions see some standard work on physiology or neurology, such as Barker, *The Nervous System and Its Constituent Neurones,* or Herrick, *Introduction to Neurology.*

[2] The axon is a process of a neuron which conducts impulses away from the cell body.

[3] Synapse is the place where the nerve impulse is transmitted from the axon of one neuron to the dendrites of another neuron.

[4] Dendrite is a process of the neuron which conducts impulses toward the cell body.

The autonomic system consists of three sections or groups of nerves, as follows:

1. The cranial division, which receives impulses from axons issuing from the upper part of the spinal cord and mid-brain.

2. The "sympathetic" [1] or middle division, which receives impulses from axons issuing from the middle portion of the cord.

3. The sacral division, which receives impulses from axons issuing from the lower portion of the cord.

The cranial division stimulates the glandular and muscular activities of digestion, and depresses somewhat the activity of the heart, thereby promoting the comfortable, slightly relaxed state favorable to digestion. The "sympathetic" or middle division checks digestion, increases the activity of the heart, and stimulates the adrenal glands. The sacral division exerts control over the sex organs and the digestive activities of the lower part of the intestines.

One of the most important facts about the functioning of the autonomic system is the antagonism between the middle division and the other two. Each internal organ has a double supply of nerves, one from the cranial or sacral division, and the other from the middle division. One set of nerves reënforces or increases the activity of the organ, whereas the other inhibits or decreases its activity. If the sympathetic division stimulates a particular organ, the cranial or sacral decreases its activity. If the cranial is active, for example, as in conditions favorable to digestion, the blood vessels of the digestive tract are supplied with plenty of blood, and heart activity is somewhat depressed (or at least is like that of quiet relaxation); but let some fear-arousing event occur, and then the middle division becomes

[1] Sympathetic is a poorly chosen name for this division, since it has nothing to do with sympathy.

active and stimulates greater activity of the heart, lungs, adrenal glands, etc., at the same time that it depresses the digestive activities; i.e., the activity of the middle division inhibits that of the upper division. Similarly anger, involving the middle division, may depress sex excitement which involves the sacral division. Thus the functioning of the autonomic system reveals a coördinated check-and-drive mechanism.

Glandular activities involved in the emotions.[1] We are all familiar with the activities of certain glands during certain emotions; for example, the secretion of tears by the lachrymal glands in sorrow, of perspiration by the sweat glands during anger, or the inhibition of the secretion of saliva by the salivary glands during fear, and of the gastric juice during anger. In addition to these activities of the duct glands, we have already noted the increased action of the adrenal glands in fear and anger. The adrenals are located near the kidneys, whence their name (although functionally they are unrelated to the kidneys). They secrete adrenalin directly into the blood, stimulating the heart, muscles, liver, etc., as previously noted.

Emotions as preparatory reactions; the Emergency Theory. The organic responses in strong emotions, such as fear or rage, really are preparatory reactions, placing the individual in readiness for flight or combat. The rapid circulation, the inhibited digestive processes, the provision of abundant fuel for muscular activity, the deeper and more rapid breathing, and protection from fatigue are admirable adaptations for extraordinary muscular exertion. Such facts as the foregoing have led Cannon, an American physiologist, to formulate his well-known Emergency Theory of

[1] For reliable treatment of glandular functions consult Barker, *Endocrinology*, 5 vols.; Harrow, *Glands in Health and Disease*; or Weil, *The Internal Secretions*.

the Emotions, according to which the sympathetic system is regarded as a well-coördinated check-and-drive mechanism activated by events requiring prompt, violent, and possibly prolonged physical exertion.

Under conditions of primitive life such an arrangement probably had considerable value, since the preservation of the organism often depended upon its prompt and vigorous physical reaction to loud sounds and unusual noises, to the presence of wild beasts or strange human beings, or to other fear- and anger-provoking situations. However well the theory may fit primitive-life conditions, its value under the circumstances of modern civilized life is very small indeed; in fact, the immediate result of highly exciting events usually is a disruption of the individual's organized activity, as James and others have frequently noted, and may be an actual obstacle to effective responses, as we shall see presently.

In case of fear, sex, hunger, and anger, the internal changes are a preparation for overt action. Too little is known about the internal changes involved in the other emotions to enable us to determine the extent to which they, too, are preparatory reactions.

Emotion and impulse. Without entering into an elaborate discussion of emotion and impulse, we should note that the two terms are frequently confused. Psychologists, distinguishing between them, regard impulse as the "wanting to do something," that is, the tendency to recoil or escape from some fear-provoking stimulus, and emotion as the "feeling somehow," the "complex of sensations" aroused by the exciting event. The impulse is an adjustment toward some specific reaction, such as attacking, running away, trying to hide, etc., whereas the emotion consists of the "complex of sensations" from the inner organic changes previously described.

The difference between emotion and instinct. We are now in position to consider the difference between emotion and instinct. In Chapter VII we used the term instinct to refer to any of the organism's unlearned tendencies to overt action and showed that the trend of psychological thought at the present time greatly modifies the earlier views according to which instincts were regarded as mysterious innate entities or "mythical potencies." Upon careful examination, many of the so-called instincts turn out to be modifications of innate tendencies and consist in large part of learned elements.

Sometimes emotion and instinct are closely connected, both being manifested in the same behavior series. Thus fighting is regarded as instinctive, but the situation which evokes it also gives rise to anger or rage, which is regarded as an emotion or preparatory reaction. We see here then one important distinction. When the unlearned activity is overt and involves external objects, it is instinctive; but when it is merely inner, consisting of internal responses involving particularly the visceral and glandular mechanisms, it is emotional. Furthermore, we have already noted that an emotion is a preparatory reaction, so that we need only recall that an instinct is an inner adjustment "directed toward the end-reaction." [1]

[1] According to Watson, who considers consciousness a figure of speech, the distinction between instinct and emotion appears clearly in his definitions. Both are hereditary "pattern-reactions," but in an instinct the separate elements are "movements primarily of the striped muscles," whereas an emotion involves "profound changes of the bodily mechanism as a whole, but particularly of the visceral and glandular systems." (*Op. cit.*, pp. 252, 215.) He holds further that when the "overt, explicit activity is emphasized," fighting (for example) is an instinct, but that the activities of the visceral and glandular mechanisms involved constitute the emotion rage.

According to McDougall, however, instinct is an innate psycho-physical disposition consisting of three parts, cognitive, affective, and conative. Both the cognitive and the conative may be greatly modified "while the

2. *Measurement of the emotions*

Measuring the emotions is a difficult task whose full discussion would take us too far afield. Accordingly, we merely mention some of the methods used, and append at the end of the chapter references to some of the significant literature on the subject.

Methods employed. One method is known as the word-association method. The individual is asked to make a word-response immediately to previously selected stimulus words which are presented orally or visually one after another. "Significant" words refer to some emotional situation. If the individual hesitates, or responds with significant words, he is believed to have emotional tensions along the indicated line. Other variations of this method are used. Sometimes slips of word or pen, dream analysis, and the individual's account of previous experiences are utilized in an endeavor to discover underlying emotional stress.

An increased amount of sugar in the blood or urine (glycosura), after some stimulus or situation has been reacted to, is taken as evidence of an emotional state. Another laboratory method which is being used extensively, especially for improved technique, employs the psycho-galvanic reflex. The increased deflection of the needle of the galvanometer upon the presentation of a given stimulus is regarded as an indication of its having aroused an affective tone.[1] Other methods seek to infer emotional tension from respiratory, vaso-motor, and reaction-time changes.

More recently Woodworth has devised an emotional stability questionnaire (described briefly in section 7, of this

central part (the emotion) persists throughout life as the essential unchanging nucleus of the disposition." (*Op. cit.*, pp. 34–35.)

[1] See, for example, Smith, *The Measurement of Emotion*, and Wechsler, *The Measurement of Emotional Reactions*, for a discussion of results obtained by this method.

chapter), and Pressey has published his cross-out group test of the emotions.[1]

On the whole much work remains to be done before we have adequately valid means of measuring the emotions.

3. *Classification of the emotions*

Many enumerations and classifications of the emotions have been made. We note two of these.

Watson's list of emotions. Watson,[2] in his behavioristic psychology, holds that the original human emotions are just three in number — fear, rage, and love (in the sense in which Freud uses the term *sex*). These are three of the coarser emotions appearing on James's list, grief being omitted.

Gates's classification. Gates [3] gives a useful list of emotions associated with the action of the middle division of the autonomic nervous system. Adding to his list sex emotions, which, as we know, involve the sacral division, we have the following:

1. Anger, and such states as rage, fury, vexation, irritation, revenge, and possibly jealousy and scorn.
2. Fear, and dread, terror, anxiety, worry, melancholy, and possibly grief and regret.
3. Excitement, shock, uneasiness, embarrassment, and nervousness.
4. Pity, sympathy, elation, and enthusiasm.
5. Sex excitement, lust, and love.

Primary and higher emotions. Attempts have been made to divide the emotions into two groups: (1) the primary, which are not learned or acquired through experience but are part of man's native constitution; and (2) the "higher," which are derivatives of the primary ones, being built up through experience. When such groupings are made, anger,

[1] See *Pedagogical Seminary*, vol. 32, pp. 224–25, for an evaluation of the Pressey test.

[2] *Op. cit.*, chap. 6.

[3] *Op. cit.*, p. 165.

fear, grief, mirth, tenderness, disgust, curiosity, and lust are regarded as primary emotions; whereas the higher ones include various states belonging to the æsthetic, social, and religious groups, and comprise such compounds and consolidations as affection, pity, gratitude, admiration, hate, reverence, resentment, disappointment, surprise, and the emotions involved in appreciations of various sorts.

An entirely satisfactory classification of the emotions is lacking. Experience modifies them from earliest infancy, and what we usually observe in the child and youth, as well as in the adult, are modified emotional responses into which instinctive and learned elements have been inextricably woven to form a functional unit or behavior pattern.

New emotions at adolescence. We can find no valid evidence that adolescence introduces any new emotions, with the possible exception of certain features of sex. We have been unable through observation or otherwise to find any other emotion which is present during the teens but absent before that time. Undoubtedly many phases of the sex emotions are present before puberty, but we believe that normally lust is primarily dependent upon maturation, at least the heterosexual aspects of it. However, some emotions become stronger during adolescence; in fact, the emotional changes of these years are largely modifications of emotions already present at the dawn of puberty, together with consolidations with other tendencies.

4. *Individual and social significance of the emotions during adolescence*

Of what use are the emotions to the adolescent? What part do they play in his life? In what ways do they help or hinder his social effectiveness? Let us briefly consider the significance of a few of the stronger ones, and then summarize their value in the daily life of the adolescent.

Anger. Of what value is anger? While it involves internal changes which prepare the organism for violent physical exertion, as we have seen in the first section of this chapter, and consequently may have served a useful purpose under primitive life conditions, it obviously has no such value at the present time. Even in physical contests where competition is the strongest, anger is often a handicap rather than an aid. The enraged person's intellectual powers are not at their best; his perception may be faulty; his judgment, clouded; and his coördination and timing of complex activities, poor indeed. Modern life presents relatively few occasions for which anger is a useful preparatory reaction. On the other hand, its complete elimination probably is impossible, and undoubtedly is unwise. Some circumstances may be presented to which anger is the only rational response. The ready giving way to anger and its expression, so characteristic of the little child, needs, of course, to be modified, and, as a matter of fact, usually is modified by early home training, supplemented, as the child gets older, by group opinion, religion, and other similar controlling forces of the child's social environment.

Much of this training in control of anger relates to inhibiting its outward expression, and, accordingly, is repressive. The strain of modern life consists partly of the many irritating situations which naturally provoke anger whose outer expression is, however, proscribed by social usage. Repressing anger is largely negative, and undoubtedly is a cause of much strain upon the individual. Accordingly, positive procedures are also highly desirable. Parents and school must be interested in more than having children merely inhibit the expression of this emotion; they must be vitally interested in preventing or avoiding its beginning. Keeping from being angered by many of the irritating events of life is of vastly greater worth for the individual's peace of mind and

general effectiveness than merely inhibiting the outward expression of the emotion, once it is aroused. The kind of self-control of greatest value, then, is that which prevents one's being angered by many of life's situations.

Building up such self-control is a slow process, in which the influence of the home may be very valuable. Conservation of the child's health (see Chapter XVI, section 1), many opportunities for self-expression, reasonably wide social contacts, and other measures which help develop a sensible personal attitude toward many irritating situations, are likely to help build up a self-control more or less free from the stress and strain of needless emotional conflict,[1] whose dangers are discussed in a later chapter of this volume.[2]

The moral value of anger depends upon the extent to which it is socialized and is not merely a disguise for the individual's own personal irritation or ill-feeling. Socialized anger may be useful in combating social injustices, although a limitation upon its value for this purpose is its frequently short duration. For example, righteous indignation may be aroused over some exciting event, such as needless loss of life through official inefficiency, or private disregard of well-known provisions for safety, or some social wrong, but it soon subsides. Selfish interests, preying upon public resources or endangering public health and safety, rely upon the temporary nature of strong anger and indignation for continuing their anti-social activities. Of course, anger may color one's attitude more or less permanently. Marshal Joffre [3] said that "From the age of seventeen, I dreamed of

[1] See also section 5 of Chapter VII, on the Modification and Control of Instinctive Tendencies, and the following section of this chapter on the Control of the Emotions.

[2] See sections 4–7 of Chapter XV, and the references at the end of it.

[3] *New York Times*, January 20, 1920.

revenge, after having seen the Germans at Metz." We have, too, the testimony of Lincoln that his first visit to the New Orleans slave mart had a permanent effect upon his attitude toward slavery.[1]

Fear. We have already indicated the possible value of fear under primitive conditions, inasmuch as the situations which originally evoke it were then likely to be dangerous, but, as we have just seen in the case of anger, we may very well question whether fear has any great value for adaptation to the conditions of modern life. Extreme fear, as is well known, is often a serious hindrance to escape from danger, is a handicap to mental health, and decreases the effectiveness of responses to situations which require great precision of muscular activity or clear, hard thinking.

As the child grows up and has more and wider contacts with the objects and events of his environment, he gets used to them, comes to know that they are not fearful, and so loses many fears which he may have had during early childhood.[2] By the time adolescence is reached, he normally has very few of them indeed, but his freedom from fears of the external environment does not mean that he has no fears. On the contrary, accumulating evidence indicates that he may and often does have fears which are aroused from within, by his thoughts. Such internally stimulated fears seem to be largely a result of the social forces which have acted upon him. Often parents are unwise enough to instill fear in a child as a means of control, instead of trying to build up a rational obedience. Sometimes very suggestible children develop morbid fears from the stories deemed appropriate to their years.

[1] Stratton discusses the moral and religious uses of anger in his book, *Anger: Its Religious and Moral Significance.*

[2] The probability is, however, that many of these childish fears are *conditioned* emotional responses, rather than *innate* ones.

Fear has little to commend it as a means of control. It is largely negative, whereas positive measures are to be preferred. As the child grows older, becomes adolescent, and finally reaches manhood or womanhood, fear as a means of control normally has less influence over him. Proper home and school training, it seems, should make little use of it, even at the earlier ages. Great fear is a disintegrating, disruptive force from whose baneful influence the child should be as free as possible. Nor do we see that it has any marked positive value for adolescents. The purposes it serves can be attained more effectively through intelligent rationalized control.[1] We believe that the evidence from mental hygiene, child psychology, school management, and the administration of business and other vocational enterprises indicates not only the slight individual and social value of fear but also the enormous value of its opposite — of courage to meet the situations of life squarely and aggressively, and to discard old habits, manners, and customs, as their inadequacy becomes apparent.

In like manner such states as terror, dread, worry, anxiety, and melancholy seem to have little positive value, but rather, under the conditions of modern life, seem to be definitely detrimental to the mental health, happiness, and general effectiveness of child, adult, and adolescent.

Love and other emotional states associated with sex. The emotions arising from the sex instinct are among the strongest and most important experienced by man. Love of parent and child probably involves some sex elements, as do also the friendships of adolescent boys and girls and of men and women. Altruism seems to come partly from the affection of parent for child, from the "tender emotion" which McDougall associates with the parental instinct. While certain features of the sex emotions undoubtedly appear long

[1] See Chapter XVIII, "The Guidance and Control of Adolescent Behavior."

before puberty, their strength is greatly magnified at adolescence, as would naturally be expected. Accordingly, an important problem of adolescent education and guidance is developing such useful controls and substitute-activities as sublimate the crude sex elements of the instinctive and emotional tendencies. A sane program of sex instruction and sex hygiene, beginning in childhood and continuing through adolescence, is highly desirable.[1]

Other emotions. The values of such states as shock, excitement, embarrassment, elation, enthusiasm, sympathy, pity, disgust, and grief are largely confined either to their loading situations (through the operation of the law of effect) so as to secure desirable responses and prevent undesirable ones, or to their possible utilities described in the next topic. Mirth probably possesses additional recreational, balancing values.

The value of emotions in daily life. Aside from their use in rarely occurring emergencies previously discussed, the emotions have at least four possible utilities and one possible harmful effect which should now be considered.

1. *They relieve the monotony of a highly perfected machine.* Life would, indeed, be a stale, highly monotonous, uninteresting, drab affair, if we did not experience the ups and downs of changes in emotional tone; personality, too, would lack much of its attractiveness, if man lived only a machine-like existence.

2. *In some cases they may make possible greater achievement.* On this point we cannot be sure. Opinions differ. It may be perfectly true, for example, that Byron, De Quincey, Goethe, Poe, and other geniuses produced masterpieces under the stimulus of some great emotion — masterpieces which they could not have produced under less ex-

[1] Certain items of such a program are noted in Chapter XVI, in the section on Social Hygiene.

citing circumstances, as has often been alleged. The vast majority of men, however, do not do their best work when greatly wrought up emotionally. For them a strong emotion is an interfering factor. The skilled surgeon desires to be as free as possible from a strong emotion when he is engaged upon a delicate operation. Similarly, business executive, lawyer, statesman, mechanic, parent, teacher, or student in high school or college is likely to be most effective in performing the complex tasks of everyday life if he is undisturbed by any great emotional upheaval. As a general rule, then, strong emotions do not facilitate achievement, although in special cases they *may* do so.

3. *Strong emotion may help to break up a stereotyped emotional attitude.* If the individual has got into a rut of some kind; if he is quite content to work far below his highest level of efficiency; if he has rationalized his lack of application and persistent effort, for example, upon the ground either that he is earning more than he is being paid or that it doesn't pay to work too hard; or if he is not doing his best because he gives so much of his time to feeling that others have it in for him; or if he has made some other similar faulty adjustment to life's demands; then, sometimes, a strong emotional disturbance may help break up this attitude or habit and stimulate him to greater effort, and to definite attempts to improve his work. Similarly, an emotional disturbance may be of positive value to the adolescent, aiding him to break up some ineffective way of responding.

Although many cases are found illustrating this third value of strong emotion, yet they are relatively not very numerous. We should not conclude, however, that *one* emotional upheaval is powerful enough to break up an old behavior pattern and form a new one, because habits of conduct are not so easily changed. One's past is in many re-

spects part of him, and cannot be sloughed off at will. Even the emotional turmoil incident to religious conversion in times past has not been effective enough in and of itself to prevent numerous cases of "backsliding," and has been largely supplemented or supplanted by activities which habituate in desired lines of conduct. Yet it is true that a strong emotion *may help* to modify behavior patterns, largely through the law of effect, described in Chapter IX.

4. *They give quality to personality.* Controlled and modified emotions, especially the consolidations of primary emotions and other elements into such so-called "higher" emotions as the religious, social, and æsthetic, give a distinctive quality to human personality, and constitute one of its dynamic aspects.

5. *Their effect may be harmful.* In the long run, strong emotions may have a deleterious effect upon health, since they involve excessive stimulation of the visceral functions, illustrated by the well-known effect of anger, grief, worry, and excitement upon the digestive processes.

5. *Control of the emotions*

Need of emotional control. Emotional control, although difficult, is necessary to protect the adolescent from the distracting and disintegrating effects of the chaotic internal turmoil characteristic of strong affective states, and thus to give him the stability and independent self-direction which should be developed as he attains manhood. It is also needed to prevent emotional enjoyment from becoming a substitute for overt action, and thus hinder the development of strong moral character (see Chapter XI). Emotional enjoyment has its place in adolescent personality, but it should not become debauchery, or an end in itself. Suitable control is an aid to mental health, moral character, and general personal effectiveness, because it reduces the inner

turmoil and gives a larger place to rational self-direction and to worthy impulses which lead to overt action.

Conditions favorable to emotional balance. Many conditions aid the growing child to secure suitable emotional balance or control. Two of them are as follows:

1. *Good general health.* The child who is well-nourished, gets plenty of sleep regularly, and has adequate vigorous play and other suitable recreational activities, is better able to control his emotions than if he were undernourished, tired, unoccupied, and in poor general health.

2. *Avoidance of highly exciting events.* Young children should be kept free from the shock of too exciting events. By common practice they are protected from many situations which would arouse very strong emotional reactions; yet they often are witnesses to parental wrangling and other turmoil at home which are not conducive to their developing emotional balance. Avoidance is often of value for both adolescent and adult. If the individual knows from experience that certain events are very disturbing, he may wisely avoid them on certain occasions. Every person is likely to find in time that certain situations are quite upsetting, and that a good way of maintaining his personal effectiveness is to shun them. Especially is this true of such emotions as lust and anger. Avoidance is very often the part of wisdom, well-illustrated by the story of the Irishman, who, having remarked that he wished he knew the place where he was going to die, and being asked, "Why?", said that he would never go there. The youth needs a gradual acclimatization to exciting events, often through the substitution of less exciting for more exciting ones. Yet, on the whole, we do not regard avoidance as the best means of preventing or controlling strong emotions, because adaptation to the ordinary conditions of life necessitates emotional control under very disturbing circumstances. Avoidance has positive value in some of the circumstances just indicated.

In what emotional control consists. Emotional control can be built up in either of the following ways:

1. *Inhibition of the expression of the emotion.* From early infancy until manhood and womanhood, society, through the family, through public opinion, and through other similar agencies, brings pressure to bear upon the individual to lead him (or force him) to give up socially disapproved ways of expressing his emotions. While the outward expression may be inhibited, the psychic "reverberations" may be present in great strength, and sometimes are a cause of personality disturbances, as we shall see in Chapter XV. In the vast majority of cases, however, the development of control of the outward expression takes place at the same time that experience or training is building up the second kind of control, so that the emotion-evoking situations tend more and more to be less exciting, and the individual finds psychically equivalent substitute activities.

2. *Modifying the interpretation of the stimuli.* Probably the most effective way of controlling strong emotions is by modifying the cognitive aspects of the stimuli evoking them. By this we mean that a different interpretation is placed upon the hitherto exciting events; they are apprehended as not-exciting. This is but another way of expressing the important fact that, aside from the few sorts of situations that originally provoke emotions, the sense organs really are not the true receptors for the emotions, but that the integrative nervous mechanisms are. This is doubtless part of the meaning of Maeterlinck when he says: "The event itself is pure water that flows from the pitcher of fate, and seldom has it either savor or perfume or color. But even as the soul itself may be wherein it seeks shelter, so will the event become joyous or sad, become tender or hateful, become deadly or quick with life."

Many illustrations indicate that control is built up by the

individual's coming to see the event in a different light; that is, by his reclassifying it. Having experienced the inner turmoil of some strong emotion aroused by a particular situation, the youth finds, let us suppose, that the emotional disturbance is very annoying, or interferes with his effectiveness in some thing about which he is greatly concerned, so that he does not want to experience the emotional upheaval in such situations. Here the law of effect operates to facilitate conditioning a different response. So the youth may thereafter experience that particular event as the "situation which formerly provoked an annoying, but from now on a to-be-avoided emotional response." He may go no further than this, and may thereafter perceive the event as an unexciting one; but, if he is to attain adequate control of his emotions, he must go further. He may resort to several "tricks of the trade." He may, for example, build up an attitude of superiority toward the emotion-arousing quality of the situation, really regarding himself as above being aroused by such a crude, or obviously simple affair. Or, he may interpret or reclassify it in other ways, as the following illustration shows.

A physician was called by a greatly excited man to attend his mother, who had been taken suddenly and desperately ill. The physician had another very sick patient to whose home he had just been summoned. He explained this fact over the telephone, telling the man he would be over to see his mother in twenty minutes or half an hour, but for him to call another doctor if he felt he should not wait so long. The man threatened to do bodily harm to the physician if he did not come at once, and called him some insulting names. The physician calmly replied, "Oh, no, you're worried. I'll be over just as soon as I can," and hung up the receiver. He made the two calls as arranged, was not the least bit stirred up, but gave his best attention to both cases.

Some days later he said to the man, "You said some things over the telephone the other day; now just what did you mean?" — for the physician was a high-strung, very sensitive Southerner. The man apologized heartily for his hasty, insulting words. How did the physician build up that control? Certainly it was not through fear, because it is doubtful if he ever felt physical fear. Nor was he a man of sluggish disposition. On the contrary, we have just indicated that he was high-strung and alert.

His control had two significant elements in it. First, he knew that he must not let personal events affect his professional duties. This was a guiding principle that had been made habitual. He refused even to sense the full significance of what the man was saying, very much as one can hear vivid descriptions of horrifying or disgusting scenes, be aware of what is said, but refuse to allow the horrifying details more than a certain cognitive status. Second, he knew the man was greatly excited, and, therefore, not entirely responsible for what he said. We might note in this connection the shrewd observation of Epictetus:

> Everything has two handles; one by which it may be borne; one by which it cannot. If your brother acts unjustly, do not lay hold on the affair by the handle of his injustice, for by that it cannot be borne; but rather by the opposite that he is your brother, that he was brought up with you, and thus you will lay hold on it as it is to be borne.

The individual may find it profitable to form the protective habit of carefully analyzing a situation to see its true significance, and thus rob it of undesirable emotional aspects. In this way new events may be met with emotional control. Under certain conditions, for example, those usually evoking worry (or some other strong emotion), the individual may have habituated himself to analyze the situation to see the elements involved in it, to see what are the

"ponderables" and "imponderables." He may then center his attention upon the former elements, or he may merely note the occasion likely to cause worry, and then turn his attention to the matter in hand, deferring consideration of the former until a more appropriate time.

Greater familiarity with some situations may result in their losing their formerly exciting nature, and taking on a more or less commonplace, prosaic character. Whatever the means — and they will vary from one youth to another — they are all alike in that the nature of the stimulus is altered by changing the interpretation of it, that is, by reclassifying it.

Helping the adolescent attain emotional balance and control. We have listed four conditions and means which may help the adolescent attain emotional balance and control. In utilizing them, the youth should be put more and more on his own responsibility for self-direction and control. Acquiring emotional control involves the same laws of learning (exercise and effect) as are used in forming other habits or in acquiring information. Socially useful modification and control, rather than attempted elimination, are the objectives, because many emotional outlets give zest and spice to life and add important qualities to the personality, without decreasing the individual's effectiveness.

6. *Emotional development during adolescence*

Emotional maturity. Emotional maturity refers to the stage of development of an individual's emotional life as compared with that of others who are older, younger, and of the same age. Accordingly, we may speak of an adolescent (or an adult) as making a childish emotional reaction; or we note that another is normal or quite mature in his emotional responses. We must remember, however, that the terms, emotional development and maturity, may suggest more

precise and valid means of appraising emotional behavior than we really do possess. As a matter of fact we have, thus far, no means of accurately determining the emotional changes that take place from one year to the next. Accordingly, we do not have valid reliable data from which to draw growth curves showing the emotional development of the adolescent. Our use of the terms implies no greater precision than comes from careful observation.

The emotional maturing of the adolescent boy. By the time puberty is reached the boy normally has experienced many emotions, as pity, sympathy, joy, grief, regret, jealousy, worry, embarrassment, gratitude, admiration, surprise, and the like. He has acquired considerable control of his emotions, and has passed the stage of their crude childish expression. He should have a certain stability. He has lost his fear of many objects and events of his surroundings which at one time evoked this emotion, and his development during the teens is likely to continue still further in the same direction. Likewise, he has learned to curb anger, and can meet thwarting with less internal commotion. He usually makes considerable progress during adolescence in controlling this strong emotion. Of course, his development may not have been normal. The education and training of the emotional disposition of the child are often neglected, frequently are ineffective, and many times are positively harmful. Some children seem to be less stable at the close of adolescence than at its beginning, but, fortunately, they are the small minority.

If the boy's development has been normal, the early and almost complete domination of affection for his mother has been modified, so that his father, and then his playmates (mostly boys), have come to have an increasingly important rôle in his life. By the time of puberty the gang has come to hold a large place in his life, and group opinion has become a

powerful force, whose strength is destined to increase during the teens. During adolescence the boy's affection naturally becomes heterosexual. However, over-fond mothers sometimes continue to bestow infantile attention and affection upon the boy, and consciously or unconsciously maintain such a firm hold upon his affections as prevents the normal changes indicated above and thereby interferes with his emotional maturing.

A domineering father, too, may be so cold and fear-inspiring that the pre-adolescent boy does not have the affection for him that he normally should and would have. Then, too, a busy father often sees so little of his son, and has no time for that companionship which is worth so much to the boy — a companionship which gives the father a sympathetic understanding of his son and provides the boy with a desirable outlet for his affection. Such companionship of father and son leaves ample room for friendship and association with other boys; it lays a good foundation for that mutual trust, respect, and sympathetic understanding which are so valuable as the boy grows older and has to meet the many problems of adolescence — especially those relating to sex emotions and impulses and the prevention of too early fixation of affection upon some one of the opposite sex.

In general, emotional development during adolescence is very largely a continuation of a development which began long before puberty. Yet it is undoubtedly true that adolescence presents its own characteristic changes, as we would expect on account of the widening of life's experiences, the development of intellectual and other powers, and the greater strength of certain emotions and impulses. The youth's emotional tendencies are being modified and fitted into that total organization of traits known as personality.

The emotional maturing of the adolescent girl. The girl's development of emotional control resembles that of the boy,

in many respects. Similar modifications of childish responses normally take place. By the beginning of puberty she normally has progressed far in controlling the emotions which she has experienced from early childhood. Modifications and consolidations with other tendencies have proceeded apace. Her emotional reactions are being rapidly organized into her total-conduct series. She has yet to face the problems arising from the strong sex impulses and emotions of the teens. If her life has been free from morbid fears and uncontrolled anger; if she has had opportunities for many-sided, vigorous self-expression; if she has not been too much repressed and has not had her freedom abnormally circumscribed by social pressure which often treats the girl unfairly; if she has been well physically and has been trained in responsibility and self-control during childhood; then she is well prepared to meet the developmental problems of the teens. We believe that the greater frequency of emotional disturbances among girls than among boys is partly due to differences in the environment. Custom still gives the boy more freedom, fewer "don'ts," and more opportunities for many-sided, active self-expression.

A girl is sometimes jealous of her father's affection for the mother, and has some difficulties of adjustment on account of it. Normally her affections come to include girl friends, and during adolescence become strongly heterosexual.

Sympathetic understanding and control, frank recognition and discussion of problems as they arise, and other features of wise guidance and control help the adolescent girl to attain womanhood with a maximum advantage from her modified emotional equipment, and with few really bothersome emotional conflicts.

Greater or less emotional stability during adolescence. Is adolescence marked by greater or less emotional tension? Is the adolescent boy more or less stable emotionally than

he was during pre-adolescence? Is the girl in her teens more or less given to emotional strain than during her childhood days?

According to a commonly accepted view, the onset of puberty is accompanied by an increase in emotional instability. In some quarters the adolescent is pictured as highly unstable, the victim of the tangled, chaotic state of his emotions.

Conflicting opinions of high-school teachers. Many persons believe that emotional stability decreases a little at puberty, whereas others believe that growth in emotional control normally continues from childhood through adolescence with no interruption by puberty. We are inclined to question earlier views that adolescence is marked by a great increase in instability. Our own observations of high-school students, and observational data secured from many successful, experienced high-school teachers, lead us to believe that normally the only probable break in the development of emotional stability at puberty is related to the emotions arising from sex, but we are not sure how great the changes are even in this one respect. Sometimes adolescents are more prone to be moody than they were during their childhood years, and we would expect them to be, partly on account of the strong sex impulses which naturally accompany maturation.

Our own data indicate that anger, fear, and other nonsexual emotions normally are better controlled during adolescence than before, and that in respect to them the adolescent is more stable than he was before puberty; not that adolescence itself has a stabilizing effect, but rather that experience, training, guidance, and control usually facilitate stability. Of course, his increased tendencies to independence and self-assertion are likely to bring him into conflict with unwisely exercised authority, and may give rise to many

irritating situations, especially at home. It may also be true that the strong sex impulses render him less stable until he can integrate them into a socially approved, self-satisfying system.

Our evidence on this problem is observational and, in the nature of the case, not objective.

Adolescent emotional development as revealed by the Woodworth questionnaire. We have some evidence from using a specially prepared questionnaire which purports to give an index of inner tensions. Woodworth's questionnaire, or "personal data sheet," contains a series of questions (to be answered by yes or no), relating to certain complaints and unfavorable reactions. Originally designed for use with army recruits, the blank has been revised so that it can be given to groups of high-school students. Sample questions are given to indicate the nature of the data sought.

1. Do you like to play better by yourself than with other children? ..... Yes No
2. Do other children let you play with them? ..... Yes No
3. Did you ever run away from home? ..... Yes No
4. Did you ever want to run away from home? ..... Yes No
5. Do people find fault with you very much? ..... Yes No
10. Are you afraid during a thunder storm? ..... Yes No
12. Are you afraid of the dark? ..... Yes No
16. Do you talk in your sleep? ..... Yes No
22. Did you ever have the habit of stuttering? ..... Yes No
28. Are you usually happy? ..... Yes No
31. Do you ever wish you were dead? ..... Yes No
34. Did you ever have a real fight? ..... Yes No
43. Are you usually on time? ..... Yes No
49. Do your eyes often pain you? ..... Yes No
51. Have you ever fainted away? ..... Yes No
52. Does your family treat you right? ..... Yes No
55. Are you ever troubled by the idea that somebody is following you? ..... Yes No
57. Does it make you uneasy to cross a wide street or open square? ..... Yes No

65. Do you make friends easily?..... Yes No
67. Have you any very strong superstitions?..... Yes No
68. Did you ever have a vision?..... Yes No
70. Do you consider yourself a very moody person?.. Yes No

We have had this blank filled out by 576 boys and 1175 girls, students in several high schools and one normal school. Ages range from twelve to nineteen years. The essential results are shown in Table 25 and Fig. 60. If we disregard data on ages twelve and nineteen because of the small number of cases at those ages, the median number of unfavorable responses increases (with one exception) until age seventeen, and then decreases.

Table 25. Number of Unfavorable Responses of 576 Boys and 1175 Girls, Ages Twelve to Nineteen, on the Mathews-Woodworth Personal Data Sheet

Age	Boys				Girls			
	N	Percentiles			N	Percentiles		
		25	50	75		25	50	75
12	30	4.1	9.0	15.5	39	6.8	9.6	14.4
13	62	4.0	6.7	8.7	128	6.4	11.6	17.2
14	125	5.9	9.4	13.1	196	6.7	10.9	16.8
15	122	4.9	10.3	15.7	209	7.9	12.5	18.7
16	87	6.9	10.5	14.7	180	9.1	14.2	19.7
17	90	7.7	14.0	18.9	225	9.0	15.5	21.9
18	44	6.0	12.4	18.9	158	8.4	12.4	21.4
19	16	3.0	12.4	19.5	40	7.3	14.0	17.7

Girls' unfavorable responses are more numerous than boys' at all ages except eighteen, when they are the same. Mathews [1] also found girls giving more unfavorable answers than the boys did, but she found boys' scores decreasing with age, whereas our data show an increase.

[1] *Journal of Delinquency*, vol. 8, pp. 1–40, especially p. 32 for data on 500 boys and 510 girls, ages 10 to 17.

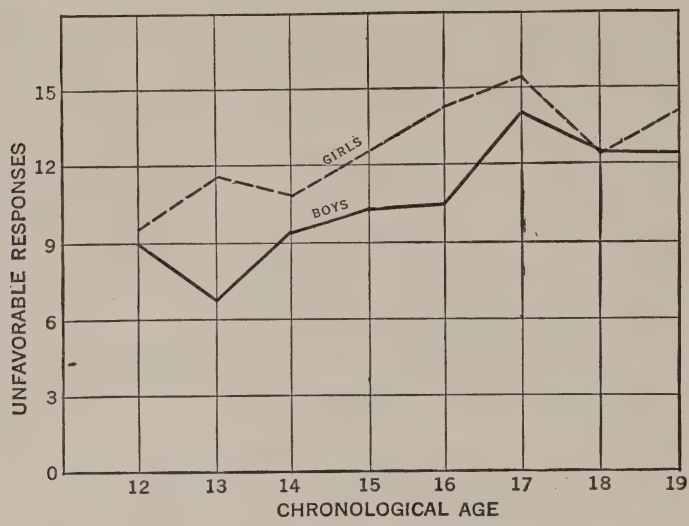

FIG. 60. NUMBER OF UNFAVORABLE RESPONSES ON THE MATHEWS-WOODWORTH PERSONAL DATA SHEET
(Brooks.)

One may well question the extent to which the answers to the questions on such a blank really measure or indicate emotional stability or instability. Aside from its being subject to all the errors incident to subjective estimates, one may well ask, for example, if some *previous* desire to steal or set fire to things, or some *previous* habit of twitching head, neck, and shoulders, really does indicate *present* emotional trends. We are inclined to believe that the value of such a blank is limited largely to use in diagnosing individual cases when the answers may be symptomatic enough to warrant further study of a case. The blank has very little value in trying to determine the trend of emotional stability at various ages.

Whatever the answers may signify, the combined data from our study and that of Miss Mathews indicate (in so far

as they may be assumed to be suitable to indicate changes associated with age) that adolescence is not characterized by any increase in unfavorable answers by boys, and by only a slight increase among girls, the boys' scores being lower than those of the girls. Hollingworth [1] accounts for the sex difference in scores upon the ground that social pressure disinclines boys to report such symptoms, and "the freer give and take of their play and other social relations" tend to correct such inclinations.

7. *Causes of emotional disturbances at adolescence*

According to Healy,[2] Groves,[3] and others the following are the more common causes of emotional disturbances during childhood and adolescence:

1. *The child's doubt of his own parentage.* Quite a few children sometime or other do question their own parentage, and are emotionally disturbed when any event, experience, or information leads them to doubt it.

2. *The child's belief that he has been deceived.* A child is likely to have an emotional conflict, if he finds out or suspects that those whom he trusts the most have deceived him or lied to him. If he finds out that his parents have not been truthful or have not dealt frankly with him, an emotional disturbance is likely to follow. True enough, he may get used to repeated deceit and come to accept it as a matter of course, but under such circumstances his parents do not have a good influence upon him.

3. *Harsh or unjust treatment.* Sensitive children may have an emotional conflict, if treated harshly or unjustly, or if accused falsely by those from whom they have every right to expect sympathy, affection, and fair dealing.

[1] *Mental Growth and Decline,* p. 266.

[2] *The Individual Delinquent,* pp. 356–57.

[3] *Personality and Social Adjustment,* pp. 71–75.

4. *Shame.* Another cause of emotional conflicts, which are more frequent with the adolescent, is shame, especially, in regard to parents, home, and their reputation; or on account of his own speech defects or physical deformities. A father whose son had red hair often called him "Red," "Brick," and similar names in a spirit of good fellowship. The boy thought nothing of it. When he entered school and his flaming hair immediately earned him an appropriate nickname, he was entirely undisturbed and took it as a matter of course.

5. *Loneliness, homesickness, and the feeling that one is misunderstood.* The adolescent often feels that his parents do not understand him. Sometimes he feels the same way about his nearest friends. Those inclined to be introverts (see Chapter XV, section 5) are more likely to suffer from such a feeling.

6. *Vanity, accompanied by sensitiveness.* Individuals who have an unduly high regard for their own ability and importance — especially those who have been spoiled at home — often meet rebuffs in their associations with others. They cannot fit themselves into the group so as to receive the approval to which they have been accustomed and which their vanity requires. As a result, such an individual either: (1) struggles to retain his former pride; or (2) retreats within himself, concealing how deeply he is hurt, even, it may be, becoming quite timid. Many high-school and college youths meet this problem.

7. *Changes in religious belief.* Young people during their later adolescent years, especially college students, face the problem of harmonizing a wider and more accurate knowledge of science with their religious beliefs. Any college teacher who has had close contact with his students is familiar with their emotional conflicts and struggles in coordinating their religious beliefs and other knowledge. If

religious teachings have been rigid, morbid, and hostile to science; or if high-school and college instruction is equally narrow, dogmatic, and hostile to religious truth; the adolescent may have needless emotional conflicts. We need not be disturbed by adolescent doubt in religious matters. The youth normally does a lot of doubting. He really is revamping his whole outlook upon life; and the critical questioning attitude, so characteristic of the teens, normally extends to all significant phases of life — religion as well as morals. The great danger is that snap judgments be taken, and a narrow dogmatic view become fixed to the exclusion of the truth.[1]

8. *The idea that one is unattractive.* This is mostly a girl's problem. That it does cause emotional conflicts is the testimony of those who have worked with adolescent girls in the home, at high school, and in college.[2]

9. *Sex.* In childhood, emotional conflicts related to sex arise not so much over the physical side of sex itself, as from the mental; that is, from curiosity which is stimulated in so many ways by our civilization, but is often repressed by parents and teachers who make excessive and unnatural reactions to harmless questions, treating the child who asks as if his mere asking were evil. At adolescence, sex impulses may cause severe emotional conflicts, if wise and sympathetically given sex instruction has not prepared the youth to understand maturation and take a wholesome attitude toward the various problems it presents.

10. *Unreasonable restrictions.* Greater independence and self-assertion as the child grows up necessitate greater

[1] See also Chapter XI, section 2, on the Religious Development of the Adolescent, and section 3 of Chapter XVI on the place of religion in the mental hygiene of adolescence.

[2] See pp. 487–89 for an account of a high-school girl who had a serious emotional conflict partly induced by the idea that she was unattractive, an idea more firmly fixed by the girl's own mother, who derisively called her "funeral face."

freedom and responsibility for self-direction. Sometimes, parental control is unwisely increased at adolescence to overcome these perfectly natural and desirable tendencies. Under such circumstances the youth often wins freedom only by an apparent repudiation of home and parents. Affection for parents and self-assertion, both strong tendencies, are thus in conflict.[1]

11. *Undisciplined impulses.* Trustworthy discipline comes from within. The problems of moral education center about building up an inner compulsion which will insure suitable conduct when external pressure is reduced to a minimum. As Groves points out, the child lacks judgment rather than a sense of responsibility. Training in self-reliance and self-control is needed, so that the adolescent may not have too many undisciplined impulses, and thus be unfitted for relatively calm self-direction. There is serious danger that the widespread, easy-going, *laissez-faire* parental control (often lack of control), which is based upon a superficially popular "never thwart or repress" doctrine, is not leading children to reliant, independent, integrated self-control, but, instead, is letting them "grow up," the victims of their own unguided, conflicting impulses.

PROBLEMS FOR DISCUSSION

1. The social significance of fear among adolescents.
2. Effects of the endocrine glands upon the adolescent.
3. The value of music as an outlet for emotions.
4. Retraining an adolescent to have desirable emotional attitudes.
5. Present some evidence showing that jealousy is (or is not) more prevalent among the brighter pupils of a school than among the duller ones.
6. What influence does the mother have upon the emotional maturing of the adolescent boy? Of the adolescent girl?

[1] See also section 3 of Chapter XVI on Mental Hygiene of Adolescence, and Chapter XVIII on Guidance and Control of Adolescent Behavior.

7. How does the father influence the emotional maturing of the adolescent boy? Of the adolescent girl?
8. Extent of high-school failures attributable to emotional instability.
9. The high-school teacher's treatment of the over-sensitive child, and of the child that worries.
10. Differences in the content of emotional conflicts before and during adolescence.
11. What are desirable means of control of "temper outbursts" among adolescents?
12. To what extent can bashfulness be overcome by the adolescent?
13. What are some effective means of handling emotional instabilities of adolescent girls? Of adolescent boys?
14. What is meant by the sublimation of sex? By the suppression of sex? Which is the wiser policy with adolescents? Why?
15. What can the secondary school do toward sex sublimation?
16. What can the home and the church do toward sublimation of sex during the teens?
17. The effect of various kinds of literature on the emotions of high-school students.
18. The "puppy-love" or "crush" experience of adolescent girls.

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CHAPTER IX

LEARNING AND FORGETTING

1. *Functions of the nervous system*

Three primary functions. The nervous system has three functions which are a basic part of the innate equipment of all human beings as well as of animals below man. So fundamental are they that we usually do not think of them, taking them for granted very much as we do the air we breathe. They are developments of three of the fundamental protoplasmic properties — sensitivity, conductivity, and modifiability. They make possible man's learning.

1. *Sensitivity.* Sensitivity or excitability is the capacity of the neurons to be aroused or affected by certain sorts of events, especially to be stimulated at their receiving ends. Our knowledge of the external world is dependent first upon the sensitivity of our neurons. Then, too, the neurons may be aroused by stimuli which come from within. All living neurons are "excitable" or sensitive to various kinds of stimuli, whether they be neurons which end in sense organ or muscle, or lie within the spinal cord or brain.

2. *Conductivity.* The nervous system also possesses the function known as conductivity. Adequate arousal of the receiving end of a neuron is not the end of the story; it makes something happen at the discharging end. One neuron discharges its nerve impulse into the dendrites of another neuron, or into the end-plate in a muscle, etc., although the exact nature of the processes involved is unknown. Even the nature of the nerve impulse is not definitely known. According to one formulation, it is regarded

as a rapidly passing wave of chemical decomposition involving a "local electrical circuit by whose electrolytic action the chemical change is apparently determined."

3. *Modifiability.* The third fundamental function of man's nervous system is modifiability or correlation, the process by which changes in behavior are made, or new units of behavior are formed. Modifiability is a necessary condition of learning, because it is essential to connecting a given response with a stimulus to which it was not previously joined.

Learning and multiple response. Learning may be defined as forming connections between situation and response, or as that modification, through experience, of the biological mechanisms by virtue of which a given situation comes to evoke a particular response which it did not previously evoke, or to evoke a response more effectively. Now the human being, like many animals, is capable of making more than one response to a given situation. The possibilities of learning are dependent upon the child's having the capacity to make any one of a number of responses to a particular situation.

2. *Laws and other conditions of learning*

Thorndike's formulation of the laws and characteristics or conditions of learning has proved a useful one. The laws are known as exercise and effect. The principle of readiness really partly determines in any case how the law of effect will operate, as we shall see presently.

The law of exercise or practice. According to common observation and popular belief we learn to do a thing by doing it over and over many times. "Practice makes perfect," we are told. The law of exercise simply means the common-sense fact that we learn by practice or repetition. It really involves two subsidiary laws, frequency or use, and disuse.

The law of frequency means that, other things equal, we learn best those things which are repeated most frequently. The law of disuse means that, other things equal, the strength of a modifiable connection between a situation and a response becomes weaker and weaker with the lapse of time during which it is not exercised. Popularly speaking, we say we are likely to forget a thing if we don't keep up some practice.

The law of recency is the opposite of disuse, and means that recent practice insures greater retention or effectiveness of learning at a given time. Furthermore, the greater the intensity or vigor with which one concentrates his attention upon a situation and the responses he is making thereto, the greater is the learning. The youth who gives close attention to a problem in physics, algebra, or English is likely to learn more about it than if his attention were only superficial.[1] Intensity or vividness is closely related to the conditions governing the operation of the law of effect.

To utilize fully the law of exercise, provision must be made for frequent repetitions and at suitable intervals to insure recency. Moreover, the law of exercise operates most effectively when reinforced by the law of effect, which we now consider.

The law of effect, or of satisfaction and dissatisfaction. In the foregoing discussion we said that, *other things equal*, one learns best the things practiced most; but other things seldom are equal, and as a matter of fact, one might not learn best the thing he practices most. Nor, indeed, would he necessarily learn a given thing better by much practice than he would by less repetition. One of the most significant inequalities in the conditions attendant upon learning re-

[1] In the older psychologies the secondary laws of association included *primacy*, in addition to *recency*, *frequency*, and *intensity*, to which we have just referred.

lates to satisfaction and dissatisfaction — those two great criteria used by man in determining values. Undoubtedly much boresome practice would not be as effective as a smaller amount of highly interesting repetitions. An individual seems to repeat and learn quickly those responses which yield satisfaction; he tends not to repeat or learn quickly those reactions which annoy.

Thorndike's statement of the law of effect follows:[1]

> To the situation, a modifiable connection being made by him between an S (stimulus or situation) and an R (reaction) and being accompanied or followed by a satisfying state of affairs man responds, other things being equal, by an increase in the strength of that connection. To a connection similar, save that an *annoying* state of affairs goes with or follows it, man responds, other things being equal, by a decrease in the strength of the connection.

One objection to the law of effect is based upon neurological considerations. "How," it is asked, "is it possible for the satisfaction following a response to stamp in or strengthen the connection between the situation and that response?" The nerve impulse, we know, travels in only one direction, always from the axon of one neuron to the dendrites of another — never in the reverse direction. Satisfaction following a response cannot reverse the direction of the neural current, and, therefore, cannot strengthen the connection. And by similar argument it is denied that dissatisfaction or an annoying state of affairs can decrease the strength of a connection between stimulus and response. Such an argument has considerable force. We would welcome a satisfactory neurological description of how satisfaction or annoyance after a response could alter the strength of synaptic connections, but that chapter of nerve physiology has not yet been written. Whatever the truth may be in the foregoing criticism of the law of effect, there is no question about

[1] *Educational Psychology*, vol. I, p. 172.

the fact that we tend to repeat responses which satisfy and to avoid those which annoy.[1]

The influence of satisfaction and dissatisfaction upon learning becomes clearer if we try to select cases in which they are not operative. Take the simple case of learning that $(3a)(2ab) = 6a^2b$. Suppose that neither satisfaction nor dissatisfaction, however mild, played any part; that to the student one response was just as satisfying as another; that, for example, $6ab$, $5ab$, $5a^2b$, $10ac$, $26xy$, 6, or any other expression was just as satisfying as $6a^2b$. What would he learn? The very fact that a response is regarded as correct tends to load with some satisfaction the making of that response. Or, take a simpler case. Suppose that one is shooting at a target, but cares absolutely nothing where the bullets go. If he really does not care where they go, then mere shooting must be satisfying, if he keeps it up; and one direction will do as well as another. If he tries to hit the center of the target, however, then satisfaction and dissatisfaction are guiding or stimulating elements in the process of learning to do it.

It should be noted in the two illustrations that some response is more satisfying than others, and that the individual *wants* to hit the bull's eye of the target. Descriptions of human learning in terms of situation, response, and connection must be supplemented to include the purposes and other conditions of the learner, because in many ways he is an important part of the situation; i.e., learning involves conditions in the learner as well as external situations.

Mind-set, attitude, or purpose. An important one of these conditions in the learner is his mind-set, attitude, or purpose. The same external situation may have different

[1] Satisfaction and dissatisfaction should not be confused with the hedonist's "pleasure and pain," since one may find great satisfaction in working at tasks some part of which really involves sensory pain; and conversely.

stimulus-values upon different occasions. Greatly interested and engrossed in a problem of mechanics, one might find a musical selection on the radio very annoying; but, in another mood, or dominated by some other mind-set, the same piece might be highly satisfying. One may enjoy his child's playful chatter, but not while he is engaged in making an important telephone call. Hence the purpose or attitude of the individual helps determine which things will annoy and which will satisfy. An important problem in high-school teaching, as in all other teaching, concerns provision for this condition of learning.

Partial or piecemeal activity. In any case, part of a situation, rather than its gross total, may be effective in producing a response. In our discussion of the relation of interests to aptitude (section 3 of Chapter X), we find a good illustration of this tendency. The small boy, attracted by the uniform of a policeman, decides that he wants to be a policeman when he grows up. Even older children, through superficial contact, analysis, or knowledge, may become interested in some vocation for which they have no aptitude. Some one phase of a situation may be the prepotent element in it which evokes a response.

Analogy. One tends to respond to a new situation as he would to some similar but familiar one. By breaking the total up into parts one often finds familiar elements to which he responds. Many mistakes in school work are due, not to sheer perversity or carelessness, but to wrong analogies, as careful analysis of errors often reveals. A good student, translating some Latin, thought *zona* meant the same thing as zone, and turned a line freely into smooth English, saying, that "the goddess traversed the broad expanse of the world," whereas zone comes from *zona* because the latter means *girdle*. His translation should have been that the "goddess was walking with flowing robes" (literally "with loosened girdle").

Associative shifting and the conditioned response. By means of associative shifting, conditioned responses may be built up. A stimulus, which does not evoke a particular response, may be connected with it so as to evoke it, usually, in the typical experiments, by presenting it simultaneously with a stimulus which does lead to the desired response. Its use is illustrated in training animals to perform various tricks. The boy who trains his dog to "stand up" when he says, "stand up," probably began by holding up a piece of meat at the same time that he said, "stand up." Eventually, he no longer needed the stimulus of the piece of meat. In fact, this process of associative shifting can be carried to the point that holding up a piece of meat might be followed by the dog's retreating to the far corner of a cage and lying down. In this manner any one of a wide variety of situations may be connected with any one of a wide variety of responses.

Sensitivity, conductivity, and modifiability, use and disuse, satisfaction and discomfort, mind-set, piecemeal activity, analogy, and associative shifting — these are the most significant factors in that modification of response known as learning.

3. *The course of improvement in learning*

The unification and elimination of part reactions. One of the most notable characteristics of learning, especially in the case of complex functions, is the presence of separate part reactions in its early stages, followed by their gradual consolidation into larger units of response and by the elimination of useless separate elements — often by the trial and error method — as practice continues. We see illustrations of these in learning a foreign language. In the earlier stages, the individual makes conscious reactions to each separate element in the sentence which he is translating. He thinks

of the meaning of each word, looking it up in the vocabulary given in the text, if that be necessary. He notes the endings of nouns, verbs, and adjectives, as well as other peculiarities of word forms, and refers them to tense, number, person, mode, gender, etc.; he considers the word order, and many known rules of syntax. He does these things one at a time, much as the beginner in music responds to each note as if it were separate and unrelated to all that precede and follow it. His translation is a painfully slow and awkward process.

With the acquisition of facility, however, he does not have to attend so much to each step in the whole process. Merely seeing some of the words brings to mind their appropriate meanings. Variations in word forms and their significance are grasped more readily. Significant clues are seen quickly. The translation is smoother and more rapid. If practice continues until considerable mastery of the language is attained, the responses to separate elements seem to fall together into a unified sequence in which the individual is not distinctly aware of them. At the same time, useless partial responses are eliminated. Certain clues come to set off responses which are effective, at the same time that other useless ones, which formerly were made, are avoided. Accordingly, after some mastery of a language, a phrase may be responded to as a unit, and the separate word elements with all their possible relationships may be no longer noted, although, as a matter of fact, the work of Judd and Buswell [1] indicates that this sort of mastery is not secured in the foreign-language teaching in our best high schools.

Analogous processes occur in learning to typewrite by the touch method,[2] in learning to play a musical instrument, or in learning science, mathematics, English composition, ath-

[1] *Silent Reading; A Study of the Various Types.*

[2] See detailed description in Gates, *Psychology for Students of Education*, pp. 245–47.

letic games, or in other activities of the high school. In learning science or mathematics, concepts have to be built up (for example, the functional concept in mathematics). Here occur inappropriate responses as well as reactions to each separate element, as seen by even a cursory observation of learning to add literal quantities or to find the specific gravity.

Learning curves. Several learning curves are shown in Figs. 61 and 62. An examination of these curves and of a great many others indicates that no one curve fits all cases. There is no one curve which may be called *the typical* curve of learning. Many curves show a rapid initial rise, followed by a slower rise at later periods of practice; but other curves show greater gains at later periods.

Theoretically we might classify all curves of improvement from practice into three types, after smoothing them to eliminate the short-time fluctuations which are found in so many of them. Figs. 32, 34, and 36 (in Chapter IV) also illustrate the three theoretical learning curves. Fig 32 illustrates learning which proceeds at a *constantly increasing rate* — the case of *positive acceleration*. The rate is slower in early practice periods and more rapid in the later ones, as indicated by the curves rising more rapidly as practice continues. Fig. 34 illustrates *zero acceleration*, since the rate of improvement is constant; that is, there is no change in the rate at which improvement takes place. Fig 36 illustrates *negative acceleration* in rate, because improvement, although taking place from one practice period to another, occurs at a *constantly decreasing rate* — the curve rises more rapidly at first and then more slowly. The rate curves corresponding to these three learning curves are shown in Figs. 33, 35, and 37, respectively.

We must be cautious, however, about assuming that the course of learning in any case really is represented by the

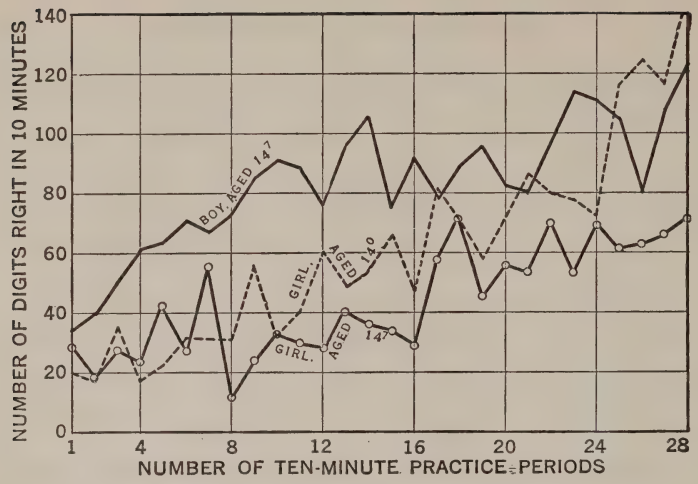

FIG. 61. IMPROVEMENT IN MENTAL MULTIPLICATION OF TWO-PLACE BY TWO-PLACE NUMBERS, IN THE CASE OF THREE SECOND-YEAR JUNIOR-HIGH-SCHOOL PUPILS

(Brooks.)

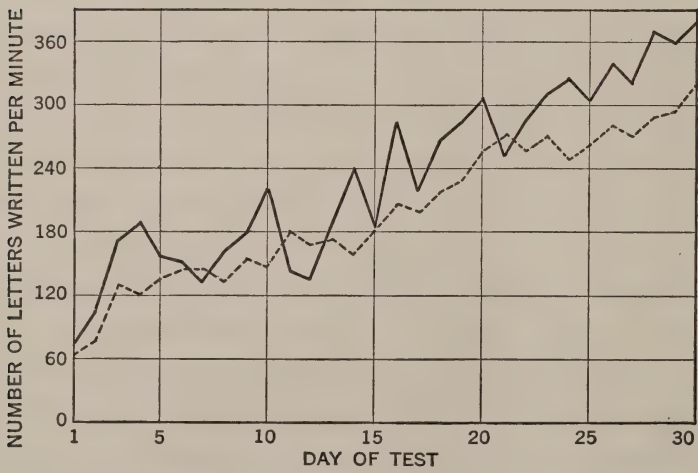

FIG. 62. IMPROVEMENT IN TYPEWRITING BY TWO SIXTEEN-YEAR-OLD STUDENTS IN A BUSINESS COLLEGE

(Brooks.)

Practice material consisted of a paragraph of forty words, and was practiced five minutes on each of thirty consecutive school days. Each student also practiced typing regular class materials from four to six thirty-minute periods per day.

graph drawn from the scores at successive practice periods. At later stages of learning the reactions are different from those at the earlier stages. Our simple graphic methods make no allowance for the difference in the size of units of early and late practice periods; in fact, we often completely disregard their existence in our interpretations of results. The curves drawn from data from practice experiments show more cases of negative than of positive acceleration, but, as we have already indicated, this may not be the real course of improvement.

Plateaus. Learning curves often are considerably flattened at the later period of practice, indicating, at least superficially, a time of little improvement. Plateaus are so common that their possible causes should be noted. They may be caused by any one or more of the following conditions:

1. *Loss of interest.* The learner doesn't care as much about the thing he is learning and consequently does not put forth his best effort.

2. *Use of an ineffective method.* An ineffective method of work soon slows down the rate of learning.

3. *Approach to the physiological limit of improvement.* If the learner is approaching the physiological limit beyond which his efficiency can hardly go, his rate of improvement slows down, showing a gradual "tapering off," rather than a sudden stop.

4. *Transition stage in learning.* In learning to typewrite, for example, the student writes first by letters, and later on by words. During the transition from writing by letters to writing by words the rate of improvement is likely to slow down very much; and similarly, in learning many other things, the transition from one level of performance to a higher one results in plateaus.

5. *Variation in method.* Shifting back and forth from one

method to another in later periods of practice tends to produce plateaus in learning curves, as do also various combinations of other factors which determine the shape of curves of improvement.[1]

4. *Principles of economy in learning*

Principles conditioning effective learning. The applications of the following principles condition economical learning during adolescence, as well as before and after:

1. *Learning is specific, but under favorable conditions may be somewhat general.* What we learn is the reaction we make. An immense amount of investigation on transfer of training indicates that it may take place under certain circumstances, but that the most effective way to learn a particular thing is to practice that thing, rather than something else. The disciplinary value alone of a subject does not justify its being given a place in the high school.

2. *Attitude, interest, or mind-set, is an important condition of effective learning,* since it has such a strong influence upon the operation of the law of satisfaction and dissatisfaction. An interested class learns more effectively than an uninterested one. Then too, attitudes toward subjects and activities may become more or less permanent, and thus exert considerable influence upon the direction of the youth's development. By applying the laws and principles of learning to his own case, one can, of course, work up an interest in the tasks which he has to do. Learning to work effectively under varying circumstances of life involves knowing how to work up an interest in getting partially distasteful, necessary activities done, as well as in learning how to avoid distractions through interest in the task to be done.

3. *Knowledge of the end or objective* is a stimulus to practice: hence the need for definite assignments.

[1] See, for example, Thorndike, *Educational Psychology*, vol. II, pp. 261–84.

4. *Knowing that material is to be reproduced, and when,* affects study habits. If assignments are made and never followed up; if themes are written only to find their way to the waste basket with no correction by teacher or pupil; if the chances are two to one, or are merely even, that the preparation of assignments will not function in any tangible way in the problems and activities of the class; then high-school students are likely to form habits of working carelessly and irregularly.

5. *Attempted recall is an aid,* not only in memorizing but also in mastering materials that require organization of ideas. Pupils need training in effective habits of study. Attempted recall is an element in such habits, since it gives a very intense and active repetition of that which is being learned and directs the learner's attention to parts upon which more work is needed.

6. *Knowledge of one's score or success and of his errors also facilitates learning.* It is highly desirable that the learner's attention be directed to detecting his own errors and successes, so that he may be trained to work independently at the same time that he learns to work more effectively by centering his attention upon the things that are causing him trouble. It is a waste of the pupils' time for him to devote much of it to things he already knows and, as a result, to neglect equally important things which he does not know. Investigation has shown that often a half or more of the errors in addition, subtraction, multiplication, and division in algebra are repeated. If some element is causing trouble, the student's attention and efforts should be centered upon it. Diagnosis of difficulties, followed by appropriate practice upon them is a condition fundamental to economical learning. Having a beginner typewrite over and over again an entire page or even a half page because of one or two errors caused by lack of facility with the letter combinations

involved in them, is a very ineffective way of teaching typewriting.

Common causes of errors in reasoning and problem-solving are as follows: superficial observation resulting in a paucity of significant facts; reasoning by analogy when there are no grounds for the analogies; inadequate comprehension of the facts and of their bearings upon the problem at hand, due, in part, to the lack of systematic analysis of details; failure to keep the problem in mind; failure to test or verify conclusions at every step in the whole process, due to lack of the critical attitude toward one's own thinking; persistence in inappropriate lines of attack; and prejudice or personal bias. A careful consideration of the causes of poor reasoning is needed when attempting to provide conditions furthering the development of good thinking.

Osburn's study of the teaching of history in the elementary and secondary schools [1] indicates that great emphasis is placed upon facts and upon memorizing the answers to thought questions. He found that 80 per cent of the questions asked on final examinations in history in the elementary school called for facts or memorized answers to thought questions; whereas 20 per cent of them might be classified as true thought questions. In the secondary school the percentages were 70 and 30, respectively. An analysis of the true thought questions showed, however, that seven eighths of them related to (1) organization and (2) analysis and judgment; whereas but 1.7 per cent of them were the effect-cause type (why questions). Questions requiring students to give proof or use constructive imagination constituted less than .002 of one per cent of the total number of thought questions; whereas not one of the 32,477 questions on high-school examinations in ancient, mediæval, modern, and American history, examined by Osburn, required generalization or inference of effect from cause.

[1] Osburn, *Are We Making Good at the Teaching of History?*

One of the most significant advances in elementary education in the past decade is due to the incorporation of diagnostic and remedial work into so many phases of instruction in the elementary school. High-school instruction is profiting by attention to the same things. Common sense, as well as careful experimentation, indicate the value of finding out each student's difficulties, and then centering attention upon overcoming them.

7. *Habits, attitudes, and knowledge are most effective when acquired in the ways in which they are likely to be used,* for then they are organized best. The sixth principle may seem at first thought to be in opposition to the one we have just stated. If we center attention and practice upon difficulties, do we not, by so doing, lift them out of their context and isolate them? That is, does not drill conflict with acquiring skill or knowledge in ways in which it probably will function? It *may,* but does not need to. In the best drill exercises, the drill material occurs in a context or has a use. It is isolated from irrelevant parts of its context, from some of the larger contextual units, and the small unit, thus temporarily isolated, is given a wide variety of practice; then it recurs in the larger context. If two or three words are causing trouble in translating we might have the pupil spend his time translating material in which they occurred merely by chance; but, undoubtedly, a more effective way would be to spend a little time upon the words and their meanings as a vocabulary drill, and then practice translating (or reading) many sentences in which *these* words did occur. Knowledge of word meanings has value chiefly because of the actual use of the words (which is mostly in context); but it is uneconomical to drill upon a large mass of material, nearly all of which is known, in order to practice the unknown parts. The smaller significant units may be used to advantage, as indicated above. The same principles apply to the other subjects in the junior and senior high schools.

8. *The avenue of presentation depends upon the material and how it is to be used,* rather than upon whether the learner is "eye-minded," "ear-minded," or much given to some other type of imagery. The older contrary views on this matter have broken down. Investigation and the opinion of psychologists indicate that the material and the use to which it is to be put (see principle 7) are of much greater significance than the pupil's predominating type of imagery. We might add that clear-cut cases of visualizers, audiles, or of any other *exclusive* single type of imagery have not been found; nor, indeed, do we have at the present time any reliable means of diagnosing pupils' imagery.

9. *The whole method of learning* (or the modified whole method, in case of very long selections) *is more effective than the part or piecemeal method in verbal memorizing;* it probably is more effective also in learning which involves the study type of reading; but its value in motor learning is unknown, although Pechstein found some evidence indicating that, in certain cases of the latter sort, the part method was better than the whole. Further research is needed to determine definitely which is the better method of learning motor skill and of learning by reading.

10. *Dividing time between reading and recitation* seems to be more effective than devoting all of it to reading alone, probably, in part, because the recitation involves attempted recall.

11. *In early stages of learning the greater emphasis should be placed upon accuracy rather than upon speed.* Speed and accuracy usually develop together; individuals who have greater speed usually excel also in accuracy. The exact proportion of emphasis varies under different conditions. Further research is needed to show the optimal division of emphasis in the case of every subject in high school.

12. *Some overlearning is necessary for retention.* Other

things equal, things just barely learned are more readily forgotten than if learned to several correct repetitions.

13. *Practice periods in the high school should not be longer than thirty minutes*, as nearly as can be determined from the experimental evidence. With recitation periods of forty or forty-five minutes, drill periods are not likely to exceed thirty minutes in length. Very short drill periods (say less than ten or twelve minutes) seem also to be uneconomical, although there may be exceptions, depending upon the amount of repetition of the function in question which may be secured in five or ten minutes.

14. *Experimental investigations have not shown conclusively just what is the best distribution of practice:* but the evidence indicates that spreading the time available for practice over several days or longer in periods of thirty minutes or slightly less is more effective than bunching it into longer and more frequent intervals and over a very few days. However, many other considerations are involved, such as the type of material, the total amount of time available, the degree of facility sought, and the length of time retention is desired.

15. *Reviews* probably should occur at increasingly long intervals of time, the length of the periods decreasing at the later reviews.

5. *General facts and principles of forgetting*

Five important facts relating to forgetting are given here, to supplement the principles of learning presented in the foregoing section:

1. *Forgetting is more rapid immediately after cessation of practice than it is later.* This fact is shown in Figs. 63 to 65.

2. *Overlearning and repetitions* at increasingly long intervals of time are aids to retention.

3. *Materials rich in associations* are retained longer than

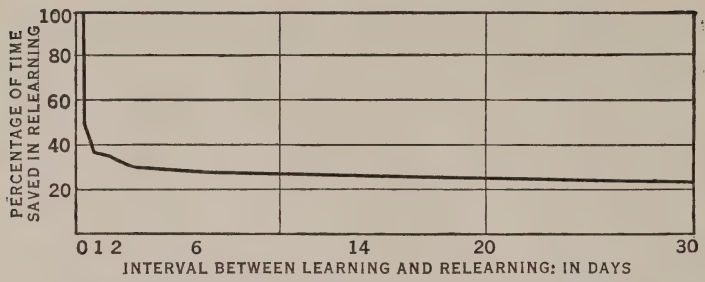

FIG. 63. THE CURVE OF FORGETTING FOR NONSENSE-SERIES
(Thorndike.)
Learned to the point of one successful reproduction, in the case of Ebbinghaus.

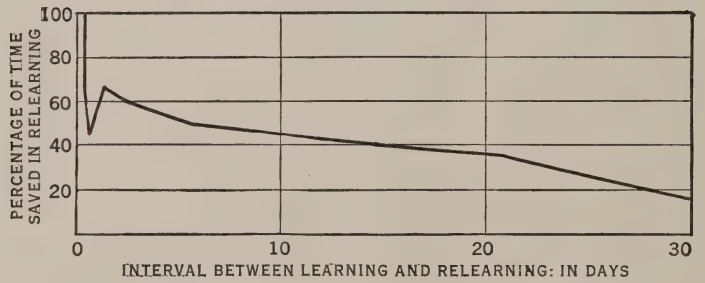

FIG. 64. THE CURVE OF FORGETTING FOR NONSENSE-SERIES
(Thorndike.)
Learned to the point of two successful reproductions, as reported by Radossawljewitsch.

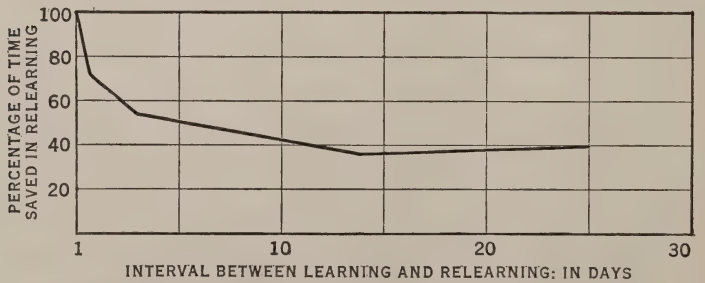

FIG. 65. THE APPROXIMATE CURVE OF FORGETTING POETRY
(Thorndike.)
Learned to the point of two successful repetitions. Drawn from data of Radossawljewitsch and Magneff.

those having few associations, other things, of course, being equal.

4. *The organization of material learned* seems to be a positive factor in furthering retention.

5. *Motor learning* seems to be more permanent than informational, probably in part on account of the greater overlearning of many of the constituent elements in an act of skill.

6. *Permanence of high-school learning*

How rapidly do pupils in high school forget the science, history, mathematics, Latin, French, English, home economics, shorthand, or other studies, once they have quit studying them? Which ones are most rapidly forgotten, and which ones are remembered best? We cannot answer all these questions because the permanence of high-school learning has been investigated in only a few cases.[1]

Retention of American history in junior high school. The history taught in the junior high school seems to be well remembered. Investigation [2] has shown that less than one fourth of it has been forgotten, after an interval of one year during which the material was not studied. History is rich in associations, and one would expect it to be retained better than nonsense syllables and other similar materials used in many of the stock experiments in learning and forgetting. The most rapid forgetting comes early after the discontinuance of learning. Boys seem to retain history a little better than girls, but the differences are very slight indeed.

At the close of a semester Bassett gave pupils, in grades six to eight, comprehensive objective tests on the history they

[1] Graduate students working under the writer's direction at Johns Hopkins University are investigating the permanence of learning in mathematics, science, French, and some of the commercial subjects.

[2] See Bassett, S. Janet, *The Retention of American History in Grades Six, Seven, and Eight.*

had studied during that semester, and repeated the tests after intervals of four, eight, twelve, and sixteen months.[1] The most significant results for our present problem, shown in Tables 26 and 27, and in Figs. 66 and 67, indicate that reviews are needed during the early part of the semester following the one in which the material is first presented. Bassett's study also shows that those who know the most history at the close of a term tend also to forget the most

TABLE 26. THE RETENTION OF AMERICAN HISTORY BY CERTAIN GROUPS IN THE JUNIOR HIGH SCHOOL AFTER INTERVALS OF ZERO, FOUR, EIGHT, TWELVE, AND SIXTEEN MONTHS
(Bassett)

GRADE	NO. OF PUPILS	SCORES AFTER INTERVALS OF				
		0 mos.	4 mos.	8 mos.	12 mos.	16 mos.
VII–B	64	56.6	47.6	44.7	40.7	39.0
VII–A	120	61.1	54.4	50.6	48.6	
VIII–B	71	60.5	48.7	45.5		
VIII–A	21	54.7	49.5	46.3		

TABLE 27. THE RETENTION OF AMERICAN HISTORY IN GRADES SIX, SEVEN, AND EIGHT AFTER INTERVALS OF ZERO, FOUR, EIGHT, TWELVE, AND SIXTEEN MONTHS
(Bassett)

NO. OF PUPILS	SCORES AFTER INTERVALS OF				
	0 mos.	4 mos.	8 mos.	12 mos.	16 mos.
1115	56.6	48.6			
807	56.8	49.2	46.0		
344	56.5	49.0	46.0	43.4	
138	53.9	46.0	43.4	40.3	38.6

[1] Each half-year's work in history in these grades in Baltimore is a unit and was not repeated during the following semester or at any other time during this investigation, although a few pupils probably read materials which may have affected their later scores. As a general rule the pupils knew very little of a term's work at the beginning of the term. There was, of course, much overlearning during a term and frequent reviews, as are generally found under conditions of good teaching.

during the ensuing year, but that they still remember the most, the correlations between history scores before and after the lapse of a year's interval being slightly more than .80. Clearly, then, reviews are needed by the best students as well as by the average or poorer ones.

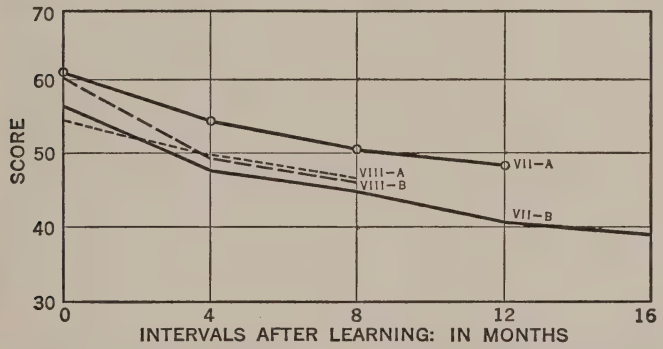

FIG. 66. CURVES OF FORGETTING FOR AMERICAN HISTORY IN THE JUNIOR HIGH SCHOOL
By grades. (Bassett. See Table 26.)

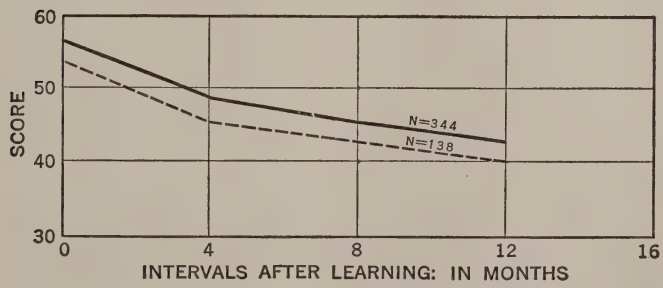

FIG. 67. CURVES OF FORGETTING FOR AMERICAN HISTORY IN GRADES VI, VII, AND VIII
(Bassett. See Table 27.)

Kinds of history material remembered and forgotten. Analyzing the retention of various kinds of material in Grade VII–B, Bassett found that items relating to home conditions,

mail, etc., were well remembered, as were also epochs and events greatly emphasized, such as Washington's taking command of the American forces at Cambridge, Franklin at the court of Louis XVI, and dramatic episodes of the Second Continental Congress; but that names of persons and places and items relating to government were forgotten more rapidly. For example, such items as the following were poorly remembered: comparison of the types of colonial government, chances for self-government in colonial days, the Stamp Act, England's tea policy, the place of meeting of the First Continental Congress, the names of the defenders of Bunker Hill, the name of the author of "Common Sense," the name of the general to whom Burgoyne surrendered, the powers of Congress under the Articles of Confederation, the Bill of Rights of the Constitution, the Alien and Sedition Acts. History which is made concrete and personal tends to be well-remembered. Boys remember better than girls materials relating to war and fighting.

French. Data on the permanence of the French learned in high school and college are very meager. What information we do have, however, warrants the tentative conclusion that the teaching of the subject in our high schools does provide enough repetition and reviews to make its retention almost as good as that of American History in the junior high school.

Retention of French in high school as measured by vocabulary tests and final examinations.[1] At the end of the third year in high school, the Henmon French vocabulary tests were given to several groups of boys who were just finishing third-year French. The tests were repeated after intervals of six months and eleven months. None of the

[1] H. F. Frank, Vice-Principal of the Baltimore Polytechnic Institute (a boy's technical high school), reported this preliminary study in a term paper.

boys considered in this investigation studied French during the senior year because the subject was offered in grades nine, ten, and eleven, but not in grade twelve. The rotation of the tests insured fair equivalence of the initial and second testings, but not of these two and the third. During the first six months of not studying French the boys' vocabulary scores dropped 7 per cent ($N = 155$). During the next five months the scores decreased 12 per cent more ($N = 130$), if the results can be taken at their face value; but we are inclined to doubt if they may be so taken. Usually forgetting is most rapid immediately after the cessation of practice. Then too, the equivalence of Form III to Forms I and II of the tests may not be exact; as a matter of fact, it is possible that the difficulty of a word may be very largely an individual affair.

Another part of this study utilized the final examination covering the second half of third-year French. The examination was arranged for accuracy and objectivity of scoring and was repeated eleven months later with fifty-five senior boys. The results indicate that approximately 31 per cent was forgotten during this interval of eleven months. Even more significant than the gross percentage forgotten is the extent of forgetting in the case of different kinds of material, the amounts varying from 7 to 70 per cent. A list of idioms appearing in third-year French were very poorly remembered, probably because the boys crammed on them for the final examination (students knew that idioms usually were included in the third-year finals), and then, having passed the course, they paid no more attention to them. At any rate, they made very good scores on the finals in June, but by the following May they had forgotten 66 per cent of what they had known on the first examination. In applying the knowledge of forms of irregular verbs (giving the French equivalents of the English forms) they did not do very well on the

final examination, and by the following May had forgotten 70 per cent of what they knew at the close of the junior year. They also forgot 59 per cent of what they knew about the principal parts of certain irregular verbs. Their scores on translating English into reasonably difficult idiomatic French decreased 53 per cent during this interval of time. But in translating previously read French prose into English their scores in May were 7 per cent less than those made the previous June.

In all of the foregoing cases there were varying amounts of overlearning, so that the loss of 19 per cent in vocabulary and of 31 per cent on a composite measure of third-year high-school French compares favorably with the year's loss of approximately 24 per cent in junior-high-school American history.

Retention of French vocabulary learned by three different methods.[1] In a carefully controlled experiment to determine the effectiveness of various ways of learning French vocabulary, Seibert secured data which throw light on our present problem, and may be compared with the work of Ebbinghaus and Radossawljewitsch on nonsense syllables already discussed (see page 259). Her experiment is too complicated for full description here. Lists of words were used on which the English form was followed by the French translation. Great pains were taken to secure lists equivalent in difficulty, and as an additional precaution they were rotated among the groups of second-year French students (college women eighteen to twenty years of age). Each student studied a given list of words until she could repeat it correctly twice. After fifty minutes a test of retention was given, requiring the French equivalents of the English

[1] See "An Experiment in Learning French Vocabulary," by Louise C. Seibert, Instructor in French at Goucher College, in *Journal of Educational Psychology*, vol. 18, pp. 294–309.

words. Again in two days a second test of retention was given, followed by relearning the list to two correct repetitions; and similarly, after intervals of ten days and forty-two days. She tested retention in two ways; first, by the amount recalled; and second, by the saving of time in relearning. The results of these two methods are shown in Tables 28 and 29, respectively.

TABLE 28. RETENTION OF FRENCH VOCABULARY AFTER VARIOUS INTERVALS OF TIME, EXPRESSED AS PERCENTAGES OF PERFECT SCORES *

(Seibert)

RETENTION	METHOD OF LEARNING			
	a. Studying silently	*b.* Studying aloud	*c.* Studying aloud with written recall	*d.* Average of *a*, *b*, *c*
After 50 min. (no relearning)	75.3	81.9	82.5	79.9
After 2 days (no relearning)	63.1	73.6	65.1	67.3
After 10 days (first relearning)	64.0	73.3	64.9	67.4
After 42 days (second relearning)	46.3	51.0	41.5	46.3

* Table 28 should be read as follows: 50 min. after learning a list of words to two correct repetitions by studying them silently, the students made scores 75.3 per cent of their initial scores; two days after the original learning the scores were 63.1 per cent of the original scores, etc.

TABLE 29. PERCENTAGE OF TIME SAVED IN RELEARNING FRENCH VOCABULARY AFTER INTERVALS OF TWO, TEN, AND FORTY-TWO DAYS

(Seibert)

PERCENTAGE OF TIME SAVED IN RELEARNING	METHOD OF LEARNING			
	a. Studying silently	*b.* Studying aloud	*c.* Studying aloud with written recall	*d.* Average of *a*, *b*, *c*
After 2 days	69.2	74.1	69.4	70.9
After 10 days	75.2	80.5	76.4	77.4
After 42 days	70.4	73.9	66.2	70.2

In two days approximately 33 per cent was forgotten, if retention is measured by the amount recalled; but only 29 per cent is forgotten, if permanence of learning is determined by the percentage of time saved in relearning. French vocabulary is thus better retained than are nonsense syllables, similarly learned and as reported by Radossawljewitsch. Then, too, it is quite noteworthy that relearning and attempted recall after two days and ten days make retention (as measured by the percentage of time saved in relearning) as good after ten and forty-two days, respectively, as it was two days after the original learning with no intervening relearning or attempted recall — a fact which illustrates the value of attempted recall in learning and of having reviews at increasingly long intervals, the shorter reviews coming in the later periods of practice. Furthermore, we should note the difference in retention after forty-two days as measured by the amount recalled and the time saved in relearning (46 per cent and 70 per cent, respectively), indicating that many things are partly learned which we cannot recall. Finally, learning French vocabulary is shown by this study to be most effective when students study aloud, not only on account of the greater accuracy and the more permanent retention, but also because of the "undisputed increase in fluency in pronunciation."

Latin vocabulary. The English equivalents of Latin words are retained more effectively by junior-high-school pupils than nonsense syllables were by Ebbinghaus and others. If the English equivalents of a list of Latin words are studied until three fourths of them are known for immediate recall, and if attempted recalls are made one week and three weeks later, then at the end of eight weeks pupils have been found to remember two thirds of those previously known. If, however, words are selected whose English and Latin forms have no similarity in sound and no associated

derivatives familiar to the pupils (such as *fuga* — flight; fugitive — one who flees), they are not so well remembered. According to the results of an investigation by Anderson and Jordan,[1] initial learning until two thirds of a list of words are known is likely to be followed by the retention of but one third of the list at the end of two months; that is, one half of those known on immediate recall are known eight weeks afterwards. Rapid early forgetting seems also to be the rule (see Fig. 68), indicating the need for reviews through vocabulary drills or use in context.

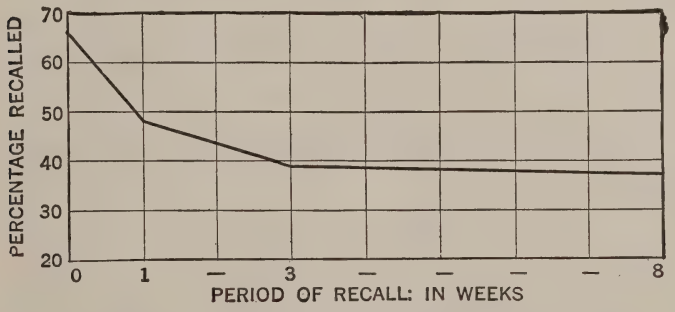

FIG. 68. RETENTION OF ENGLISH EQUIVALENTS OF CERTAIN LATIN WORDS IN GRADE VII

(Anderson and Jordan.)

The English and Latin forms had no similarity in sound and no derivative connections familiar to the pupils.

First-year algebra.[2] Ninth-grade algebra apparently is not remembered as well as seventh- or eighth-grade American history. A group of 142 students forgot in eight months 31 per cent of the algebra they knew at the close of the ninth grade. Nearly all of this loss seems to take place during the semester following the close of the ninth grade. Pupils who

[1] "Learning and Retention of Latin Words and Phrases"; in *Journal of Educational Psychology*, vol. 19, pp. 485–96.

[2] We are basing our conclusions on data drawn from a study just being completed at Johns Hopkins University by Miss Annabel Lee White.

do well in the subject retain it slightly better than the poorer students, the amounts forgotten being 30 per cent and 33 per cent, respectively. The relative standings at the close of the ninth grade and eight or sixteen months thereafter are somewhat the same, but they are not as nearly alike as in the case of American history, the correlations for algebra being around .70.

Reviews of first-year algebra are needed during the following term in order to secure greater retention. Both good students and poor students of the subject need these reviews.

General science. In three months junior-high-school pupils seem to forget 7 per cent of the general science which they knew at the end of the quarter in which they studied it; in six months they forget 12 per cent. Boys seem to do better in this subject and to remember it better than do girls.[1]

PROBLEMS FOR DISCUSSION

1. Show in detail how the two laws of learning are effectively utilized in teaching some subject. Show also how they are violated.
2. Divide the fifteen principles of economy in learning into five groups according to their importance in teaching each of the following: (1) science, (2) mathematics, (3) shorthand, (4) home economics, (5) modern foreign languages, (6) physical education, (7) mechanical drawing, and (8) history.
3. Show in detail how to insure suitable mind-set toward some task or activity such as a specific lesson in algebra, plane geometry, American history, physics, French, bookkeeping, or English.
4. The extent of special disabilities of students in the various high-school subjects.

[1] Joseph, Rosina C., *Comparative Study of Achievements in General Science of Students in Academic, Commercial, and Technical Courses in Junior High School.* Master's essay, 1929, on file at the Johns Hopkins University Library.

5. Dangers to be avoided in applying the law of use or frequency (repetition) to teaching vocabularies in foreign language, or accuracy in typewriting or in the fundamental operations in algebra.
6. Case studies of high-school failures. Effective remedial treatment.
7. What is the relative importance of the following conditions of learning: arrangement of subject matter, distribution of practice, physical conditions of the classroom, mental attitude of students?
8. Outline in detail a program of diagnosis of deficiencies and their causes in some high-school subject. What remedial procedures are suitable to overcome them?
9. Compare the values of standardized and informal (or unstandardized) tests of achievement in high school.
10. Give several illustrations of plateaus in high-school learning, stating probable causes and possible means of overcoming them.
11. Show how the school can train students to form effective study habits in some subject.
12. A pupil with superior ability attains barely passing grades in a certain subject. What steps would you take to diagnose the cause of his poor scholarship?
13. Meaning of overlearning and its relation to retention.
14. What factors determine how much overlearning is needed in any case?
15. Discuss: Overlearning is unnecessary in the case of students of superior mental ability.
16. Why is forgetting more rapid during the earlier periods of disuse?
17. When should reviews be given?
18. The work of the high school in establishing good health habits.

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CHAPTER X

ADOLESCENT INTERESTS

The interests of adolescents have important bearings on problems of predicting and controlling behavior. Accordingly, we now consider how they arise and develop, in what ways they are related to aptitude and achievement, how they may be utilized, and what the chief ones are during the teens.

1. *Nature, origin, and development of interests*

The meaning of interest. The term *interest* is used both popularly and psychologically with various meanings. It is employed to specify a condition or cause of attention, being derived from instinct and experience. It is said, for example, that we read a book, go to see a baseball game, or attend a lecture on "Aërial Polar Explorations," because we are interested. The term is used to connote also the feeling of pleasure resulting from giving attention to something. Webster defines it as "excitement of feeling accompanying special attention to some object; concern; as, an interest in Botany." In the foregoing illustration, we may attend or give attention as a matter of curiosity, merely to see what happens; that is, through an original tendency which Thorndike[1] has grouped under *general mental activity*; or we may give attention or seek the experience through the anticipation of pleasure — an expectation based upon previous experience — and hence partly due to conditions within the individual.

Interest, defined as a feeling of pleasure resulting from at-

[1] *Educational Psychology*, vol. I, p. 131.

tending to something, is not a cause but a result. We then say that the book, game, or lecture is interesting or uninteresting. Yet the two meanings are closely related, because interest as the resultant feeling of pleasure tends to condition the individual in such fashion that he does attend to certain objects or events on account of the pleasure which resulted from previously attending to them. That is to say, a previous result of attending may be, and, as a matter of fact, frequently is, a present cause of the same process. Similarly, a present result may be a future cause.

Dewey, in his little monograph [1] contrasts interest and effort, saying that "Genuine interest is the accompaniment of the identification, through action, of the self with some object or idea, because of the necessity of that object or idea for the maintenance of a self-initiated activity." This is the meaning partly suggested by the etymology of the word (Latin *inter* + *esse*). It is closely related to free or nonvoluntary attention. The feeling of strain is absent.

We use the term to connote the individual's likes in contrast with his dislikes. Our use closely approximates that discussed in the first paragraph of this section; we tend to give attention if we are interested; and the things we enjoy are interesting.

Native and acquired interests. The individual has two kinds of interests — those which are inborn, and those which are acquired through experience. We need not discuss them at any length. They are treated in many textbooks on psychology. Thorndike's [2] term for native likes and dislikes is "original satisfiers and annoyers." His list of original satisfiers includes

Being with other human beings rather than alone, being with familiar human beings rather than with strange ones, moving when refreshed, resting when tired, being "not altogether unen-

[1] *Interest and Effort*, p. 14.

[2] *Op. cit.*, vol. 1, chap. 9.

closed" when resting and at night, having sensations, initiating movements, making things happen, etc.

Original annoyers are bitter substances in the mouth, being checked in locomotion by some obstacle, being hungry, being looked at with scorn by others, "the sight and smell of excrementitious and putrid things, blood, pus, entrails."

According to some psychologists, all the native likes and dislikes are derived from the instincts; whereas others believe that many of them are not thus derived. The latter group call attention to native likes of rhythm, color, and tone which exist apart from instinct. We are inclined to accept the latter view.

Acquired interests are very numerous, and are of the greatest importance in the life of the youth, resembling modified instinctive tendencies in this respect. They are built up by experience operating under the laws of exercise and effect [1] and other conditions of learning, somewhat as follows: The child has a new experience. It is satisfying. It recurs many times and continues to be agreeable. He becomes interested in that sort of event or object. As he gets older, the situations which yield satisfaction change; those which were objects of interest at an earlier age cease to have any attraction for him; whereas other objects, events, or activities which formerly held no interest for him may now be highly attractive. The development of interests through experience is due to modifications of the same biological mechanisms as in other kinds of learning.

2. *The measurement of interests*

Some progress has been made in devising methods of determining an individual's interests, but much work remains to be done before thoroughly valid, reliable, and objective methods of measurement will be available.

[1] See Chapter IX.

The questionnaire method. In the typical questionnaire, the adolescent fills out blanks by giving data on age, grade in school, parents' birthplace and education, father's occupation, school subjects studied, subjects preferred and reasons for preference, recreational interests, books enjoyed, kinds of activities liked best, vocational preferences and reasons for them, educational plans, etc. This method is subject to certain limitations due to the unreliability and lack of validity of the data secured by using it.[1] The value of data secured from questionnaires depends upon the competence, willingness, and care of those filling them out. If they are clear, definite, and not easily misunderstood by those answering them; if precautions are taken to insure other desirable testing conditions; and if suitable means of scoring, tabulating, and interpreting the data are employed; then the use of questionnaires may be a valuable means of securing information on adolescent interests. On the other hand, if youth treat the questionnaire as a joke, or do not understand many of the questions, or do not have the information called for, this method necessarily will yield very poor results. We cannot disregard Thorndike's [2] fundamental criticism of the method upon the grounds that "the ignorance of a thousand people is no better than the ignorance of one; truth cannot be manufactured from constant errors by getting a great number of them." We might add also that no statistical device is known by which truth can be extracted from data which contain truth and error in unknown proportions. Care needs to be taken to guard against the shortcomings of this method, because some form of it is the only means now available for ascertaining important likes and dislikes of adolescents.

[1] See, for example, Thorndike, *Educational Psychology*, vol. 1, p. 32; Brooks, "Criteria of Educational Research"; in *School and Society*, vol. 18, p. 726.

[2] *Op. cit.*, p. 32.

The individual's knowledge of his own interests. A further caution is necessary in using a questionnaire to discover adolescent interests. Does a boy of fifteen know his own interests along various lines of activity? That depends upon the extent to which he has experienced them. If he has had no experience along certain lines, we could not afford to put much reliance in his statement of his likes and dislikes in respect to them. Since interests are symptomatic of aptitude (as we shall see in the next section), great care must be taken in basing vocational guidance upon them. Absence of a given interest must not be taken *per se* to mean the absence of aptitude along that line; it may mean only that the youth has had no experience of that activity.

We must remember that many of the most significant interests of life are dependent upon experience. A boy may have aptitude for a particular occupation, but if he has had no experience or contact with the activities involved in it, or, if he has a very superficial or even erroneous notion of it, his expressing an interest or lack of interest in it cannot be regarded as an indication that he either has or has not that sort of ability. Many a lad is interested in an occupation of which he knows little. Some spectacular feature catches his fancy. More adequate information, however, would dispel much of his superficial interest in it. On the other hand, he may care little for an activity about which he has scant information, but with more adequate knowledge he might care much more for it.

A recreational interest check list. Lehman[1] used a questionnaire to determine the play and recreational interests of children in Grade III and above. Part of his list and the directions are given below. The blanks are to be filled out giving name, date of birth, sex, number of brothers, number

[1] *Pedagogical Seminary*, vol. 34, pp. 281 ff.

of sisters, etc. Then follow the directions and the 200 items comprising Part A.

What things have you been doing during the past week just because you wanted to do them?

Read through the following list of toys and games and other things, and as you read through the list, draw a circle with your pencil around each number that stands in front of anything that you have played with *during the past week*, or anything you have done *during the past week* just because you wanted to do it.

1. Football
2. Basket-ball
3. Baseball with a hard ball
4. Ball with an indoor or playground ball
5. Just playing catch
6. Volley ball
7. Handball
8. Golf
9. Tennis
10. Running the gauntlet

101. Hide the button
102. Hide the thimble
103. Anty-over
104. Black man
105. Other tag games
106. Crack the whip
107. Whistling
108. Dodge ball
109. Old sow
110. Dare base

51. Having dates
52. Just loafing or lounging
53. Social dancing
54. Folk-dancing
55. Card games, such as authors, bridge, whist, etc.
56. Literary clubs
57. Social clubs, or being with the gang
58. Listening to the victrola
59. Listening to the radio
60. Playing the piano (for fun)

191. Toy horn, toy drum, etc.
192. Dolls, doll carriages, doll clothes, etc.
193. Other toys
194. Picture puzzles
195. Wire puzzles, string puzzles
196. Making or assembling a radio or other electrical apparatus
197. Playing with pet dogs
198. Playing with pet kittens
199. Playing with other pets
200. Helping somebody with his work.

Such a test is readily given and scored, but we cannot be sure that the answers are correct. It is very easy for the child to check various numbers. There is also some reason for believing that writing the names of activities is more reliable than checking them on a printed list, although writing takes more time and may not give a list of *all* the activities. If

proper precautions are taken in giving such a check list, it does give some indication of recreational interests. The repetition of such a list the same day or the next day with the items in different order probably would be of value in determining its reliability.[1]

The vocational interest test. Cowdery,[2] Freyd,[3] Miner,[4] Strong,[5] and others have devised and adapted useful vocational-interest questionnaires. We give here Miner's directions, and his results for more than 1300 high-school students in Pittsburgh:[6]

Select the three kinds of activities listed below at which you think you would do best and at which you think you would be contented to work permanently. Place the figure "1" before that group which you would place first for yourself. Place "2" before your second choice, and "3" before your third choice.

Remember the unpleasant features of the work and the conditions under which it would be carried on. Consider also whether you have the necessary health and strength, whether you can get the necessary training, and whether this occupation will give you the opportunity to utilize your good traits and follow your interests.

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[1] Obviously, the reliability of a check list such as Lehman's could not be ascertained either by correlating the "scores" on the odd-numbered items with the "scores" on the even-numbered ones, or even by correlating the "scores" from two trials of the list, because the same relative standings, usually an indication of high reliability, might here be due to chance, the very factor whose presence is to be determined and estimated. If different arrangements of the items are given on two occasions, then the difference between specific items checked at the two trials would be an index of the check list's reliability. For example, if exactly the same items checked by a pupil the first time were checked by him the second time, the test would be highly reliable, but, if none of those checked at the first trial were checked the second time, then the test would be worthless, even though the same *number* of items were checked on both trials.

[2] *Journal of Personnel Research*, vol. 5, pp. 131–41.

[3] *Ibid.*, vol. 1, pp. 319–28.

[4] *Journal of Educational Research*, vol. 5, pp. 311–23.

[5] *Educational Record*, vol. 8, pp. 107–21.

[6] Miner, J. B., *op. cit.*, pp. 314–16.

Work Interests Among the High-School Pupils of Pittsburgh

(Miner)

Group of Activities	Combined First, Second, and Third Choices per Thousand	
	Boys	Girls
Growing plants, as in farming, gardening, greenhouses, etc.	65	85
Care of animals, as in stock raising, care of horses, etc.	46	21
Operating engines, as locomotives, automobiles, steam plants, etc.	127	11
Operating machines, as in manufacturing, using linotype, etc.	33	2
Installing equipment, as electrician, plumber, gas fitter, etc.	38	0
Construction work, as in building, concrete work, railroad and highway construction, engineering, etc.	113	1
Delicate muscular movements, as dentist, instrument maker, woodworker, etc.	16	2
Discovering and repairing defects, as jeweler, automobile repairman, telegraph repairman, etc.	51	2
Transporting activities, as railroad operation, express, mail, etc.	30	3
Meeting and directing people, as secretary, floor manager, conductor, etc.	22	53
Teaching, as in school, shop, etc.	13	162
Welfare work, as in social settlements, industrial plants, Christian Associations, churches, etc.	11	102
Advisory service, as physician, lawyer, consultant, banker, etc.	73	29
Organizing people, as in societies, in work gangs, in industrial and business concerns, etc.	11	14
Influencing people directly, as in selling, preaching, campaigning, etc.	22	15
Influencing people indirectly, as in advertising, writing, newspaper work, etc.	18	33
Organized planning, as in business, in managing institutions, in developing engineering projects, etc.	57	3
Scientific work, as in laboratories, in museums, in research, etc.	114	34
Recording and systematizing records, as in office work, stenography, bookkeeping, library work, etc.	58	174
Entertaining people, as musician, actor, speaker, etc.	33	110
Artistic skill, as in decorating, window dressing, millinery, costuming, handicraft, printing arts, etc.	17	81
Artistic creation, as in writing, designing, composing music, etc.	16	52
Field of activity not on this list and described as follows: (here the pupil made his own entry)	15	11

Any occupation will involve a number of these activities, but number only those three groups which appeal most to you. Sometimes it is well to begin by excluding those you dislike. It may help you if you will also compare yourself with others of your own age.

Freyd's questionnaire refers to a great many specific items, each followed by L, ?, or D — meaning respectively, "like," "neutral," and "dislike." The directions and a brief sample follow.

Draw a circle around one of the symbols after each of the items below:

Fat men	L	?	D
Feeble people	L	?	D
Nervous people	L	?	D
Solitaire	L	?	D
Picnics	L	?	D
Football	L	?	D

The value of each item has to be determined by actual tryout with individuals engaged in each occupation for which the test is to be used. Freyd found that it sharply discriminated between a group of engineering students and a group of insurance salesmen.

Cowdery, Strong, and others at Stanford, studying the occupational and other interests of college students, have developed a questionnaire of considerable value for differentiating between those who will succeed at law, medicine, and engineering.

Wise vocational guidance is partly dependent upon knowing the youth's interests in various sorts of activities. Thus far such knowledge has been derived from subjective report, a fact which suggests the need for try-out courses, and other useful ways by which high-school students may secure reliable vocational information and contacts.

3. *Relation of interest to aptitude and maturity*

Interest and aptitude. Does interest in an activity indicate ability to perform it effectively? How closely are one's likes related to his abilities? On *a priori* grounds we would expect an individual to like better the things he can do, and to have less interest in those which he cannot do. We are not, of course, referring to his idly wishing that he could do a certain sort of thing, or to his liking for an activity of which he has only superficial or erroneous notions. If he has some knowledge or familiarity with it, and has ability or talent along that line, then he is likely to have some interest in it. At least, he would have more of a liking for it than if he had no talent for it. The boy who has mathematical ability is likely to be interested in mathematics, if he has had suitable experience with it; the person having aptitude for music is likely to be interested in it.

If an individual has had suitable experience with an activity, the law of effect operates to produce a positive association of interest and ability; but note that we just said *suitable* experience. It is possible, and often does happen, that a youth's contact with an activity contains irrelevant, unfavorable elements which condition an unnecessary dislike for it. Thus a wrong introduction to Algebra or Physics may generate at least a temporary dislike for it, even though the student may have some ability in it. Of course, more experience of the subject may change his aversion to interest, but this is a wasteful way of providing contacts, as we shall see in Section 8 of this chapter.

Experimental investigations tend to support the belief in a fairly close positive relationship between interest and aptitude. Laboratory studies,[1] however, have thus far revealed

[1] See, for example, Dashiell and Hartman, "An Experiment to Determine the Relation of Interests to Abilities"; in *Psychological Bulletin*, vol. 16, pp. 259 ff.

little relation between them, probably because of the narrow range of interests in the activities by which differences in aptitudes have been determined.

Thorndike [1] found a correlation of .89 between adults' estimates of their relative abilities and their relative interests in the studies of the elementary school, high school, and college, and a correlation of .66 between their estimates of elementary-school interests and ability in college work. These coefficients are based upon self-estimates of the reminiscent type, and are also subject to probable boosting because the elements common to interest and ability undoubtedly obscured somewhat the differences between them, so that each individual tended to estimate one and the same thing when attempting to estimate the two. However, in another study,[2] of the relation of 500 students' estimates of interest in college courses to their marks in the courses, the correlation of .22, obtained by the authors, turned out to be .70 when certain errors and interpretations were allowed for by Thorndike.[3] More recently, Bassett [4] found pupils' interest in history as measured by subject-preference ranks correlating around .40 with their scores on an objective test covering all phases of the history course for each half-year of grades, six, seven, and eight. In some cases subject-preference ranks correlated .40 or more with history scores made after an interval of twelve to sixteen months.

Interests based upon experience have considerable value in educational and vocational guidance, whose functions

[1] "Early Interests: Their Permanence and Relation to Abilities"; in *School and Society*, vol. 5, pp. 178–79.

[2] Bridges and Dollinger, "The Correlation between Interests and Abilities in College Courses"; in *Psychological Review*, vol. 27, pp. 308 ff.

[3] *Psychological Review*, vol. 28, pp. 374–76.

[4] Bassett, S. Janet, *Retention of History in the Sixth, Seventh, and Eighth Grades.*

include helping each individual find that occupation for which he is best adapted and in which he will have the most interest and be happiest. Of course, interest should not be the sole criterion in guidance, because the correlations between it and ability are not high enough to have accurate predictive value; but it is an important element in a satisfactory criterion, since, in the case of school work, it has been found to correlate as much as .40 or more with ability.[1]

Interest and maturity. Not only are interests partly conditioned by experience, as we have already seen, but their permanence and significance also are in large measure dependent upon the extent to which the individual has had typical experience of the activities in question. Accordingly, interests based upon a slight acquaintance with certain specified activities may be unstable and subject to rapid change. Maturity also introduces changes, some of which are due to the experience of specific things which maturity implies; but not all of the modifications are thus induced. We note presently changes in play-interests from childhood to pre-adolescence and adolescence. All of them are not attributable to greater familiarity with the specific activities. Games suited to six-year-old children have little or no appeal to young folks at sixteen, not so much because the latter are surfeited by much experience of them, but rather because they are more mature, have a different outlook on life, and, in fact, differ so much from the former. Corresponding age differences in social and intellectual interests also are found: they are a crude index of development and maturity.

[1] See also Fryer, "Interest and Ability in Educational Guidance"; in *Journal of Educational Research,* vol. 16, pp. 27–39; Franklin, *Permanence of Vocational Interests of Junior High School Pupils*; Kelley, *Educational Guidance*; Terman, *et al., Genetic Studies of Genius,* vol. I, p. 368; Uhrbrock, "Interest as an Indication of Ability"; in *Journal of Applied Psychology,* vol. 10, pp. 487–501; Wilson, "Interests of College Students"; in *American Journal of Psychology,* vol. 38, pp. 409–17.

4. *Recreational and social interests*

The interests of adolescents are so numerous that we have made no attempt to survey them all, but instead have selected three main groups (recreational and social, intellectual and æsthetic, and vocational) as indicative of their range and significance.

Recreational and social interests (including sex interests) normally are very strong during the teens, the latter being even stronger then than formerly. The prevalence of both is indicated by the widespread participation in many extra-curricular activities at school, and in many out-of-school organizations and activities.

Play and athletic interests. Children of all ages normally have strong interest in a wide variety of games and play activities. The types of activities which appeal most in early childhood differ from those most preferred in later childhood and adolescence. Younger children, for example, care most for activities in which teamwork or coöperation with others plays no rôle at all, whereas adolescents and some older pre-adolescents find rivalry and teamwork essential features of their most preferred games. At the earlier period the child likes to play with other children largely in the sense that the children are together when they play, rather than that any organization of group responses underlies their play. The outcome does not depend to any extent upon each child's doing a certain part in the total. The typical five-year-old enjoys having playmates, and often finds solitary play very irksome indeed, but he and his companions do not engage in organized games having rules, competition, and teamwork. The typical ten- or eleven-year-old enjoys immensely competitive activities involving individual feats of athletic prowess and skill. The boy who can run fastest, jump or throw farthest, or excel in some other similar act is highly regarded. Children of this age

are not given very much to teamwork, although some of it can be secured. Each boy on the baseball or football team wants to distinguish himself individually; there is no dearth of batters, pitchers, catchers, and first basemen, nor is there much difficulty in finding quarterbacks, ends, or others to carry the ball; but fielders and players to run interference often are hard to find. In just a few years, however, interests have changed and developed so that the boy finds great pleasure in games involving group rivalry, rules, and teamwork.

Adolescence does not, however, in and of itself bring about any sudden changes along these lines. The high-school athletic coach still faces the problem of developing teamwork and that subordination of self which enables the players to work all the time for the success of the team, and sometimes he finds the problem a difficult one. Nor indeed does adolescence eliminate the individual's interest in exhibiting his physical prowess, a tendency that persists throughout much of adult life, being readily observed in games and stunts at community picnics and other informal adult gatherings. Interest in coöperative games develops alongside of the earlier individualistic play interests, supplementing rather than supplanting them.

As children get older, the range of their play and other recreational activities seems to decrease somewhat; at least questionnaire data [1] from several thousand children and adults indicate some narrowing of interests from childhood to adolescence and the early twenties (see Fig. 69), boys indicating a slightly greater diversity of interests than girls. Girls' interests in dolls seem also to fall off sharply as the teens are entered. (See Fig. 70.)

Gangs. Early adolescence and the years immediately

[1] See Lehman and Michie, "Extreme Versatility Versus Paucity of Play Interests"; in *Pedagogical Seminary*, vol. 34, pp. 290–98.

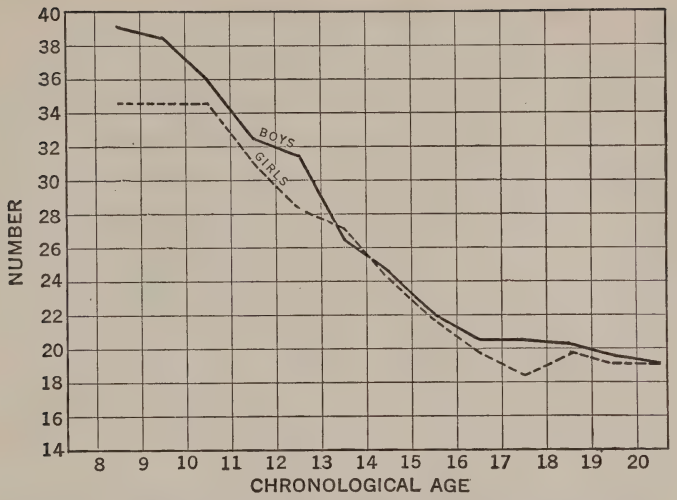

FIG. 69. NUMBER OF PLAY ACTIVITIES ENGAGED IN IN ONE WEEK
(Lehman.)
Determined from answers to a check list. N = 6359 boys, and 7373 girls.

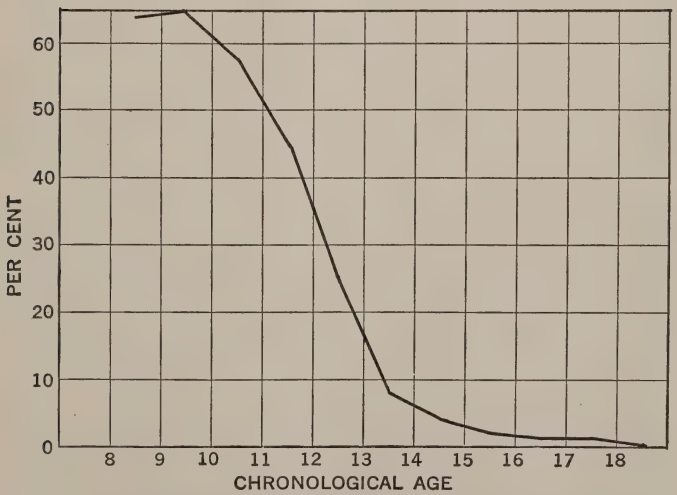

FIG. 70. PERCENTAGE OF GIRLS AT VARIOUS AGES PLAYING WITH DOLLS, DOLL CLOTHES, DOLL CARRIAGES, ETC.
(Lehman.)
During one week preceding a given investigation. Determined from answers to a check list. N = 2352.

preceding it are the years when boys take to gangs.[1] During this time the boys' or girls' interests continue to widen so that they include more persons outside the family. So strong are these interests that the boy or girl is influenced more than ever before by the opinions and standards of conduct of companions. Chums often have more influence than the father or mother. While girls' gangs are not so numerous as those of boys, yet girls are powerfully influenced by their companions' ideas, beliefs, and moral codes.

Adventure and nature interests. The lure of adventure, strong in pre-adolescence, seems even stronger in the teens. Many young adolescents feel that their home life is narrow and their daily existence too humdrum. They crave a change of surroundings. Being now larger, more independent and self-assertive, and more mature than before, many of them leave home and join, for a longer or shorter time, the army of wanderers possessed by the *wanderlust*. Probably most boys and an uncertain number of girls feel at some time or other a strong desire to go about and see other places, to be on the go. The wanderlust is not, however, confined to adolescents; it possesses those older and those who have not reached the teens. Development involves a conflict of interests and desires. Other interests compete with the spirit of adventure; society brings pressure to bear upon the individual through its manners and customs, its standards and ways of looking at things — in short, through its organization of the circumstances of life — so that normally the wanderlust and the spirit of adventure come to fill their socially accepted rôle in the lives of individuals. With some persons these tendencies are so strong that their dominance is never broken by the conventions and other interests, and, as a result, we have the adult vagabonds, hoboes, and wanderers of one sort or another.

[1] See, for example, Puffer, *The Boy and His Gang*; or Thrasher, *The Gang*.

Camping, hiking, and other similar activities are eagerly engaged in both before and after adolescence, as well as during the teens. The basic interests are derived partly from love of nature, partly from gregariousness and other social tendencies, and partly from love of adventure or wanderlust. Furthermore, they give many urban adolescents an opportunity to escape the confinement, artificiality, monotony, sordidness, irksomeness, or thwarting which city life means to so many of them. During the past decade participation in these activities has increased enormously, and at a rate much more rapid than that of the growth of our cities and towns. This undoubtedly is due in part to the uninteresting, monotonous character of much of the work in highly specialized manufacturing and other industries, as well as to the greater leisure made possible by increased production of goods.[1]

Social organizations in high school. The social interests of adolescence manifest themselves in the popularity of high-school clubs, dances, and other similar extra-curricular group activities,[2] not to mention extra-school organizations such as Boy and Girl Scouts, and Camp Fire Girls, as well as church and community organizations and activities of vari-

[1] The Youth Movement in Germany includes hiking tours to visit Germany's forests and mountains, quiet valleys, deserted castles, and silent, enchanted lakes. According to an observer writing in the *Hamburger Nachrichten*, "There is no doubt that the original impulse which led to this movement was the desire to get absolutely away from the stupefying, every-day, noisy, nerve-racking activity of the large cities. The movement thus constituted a reform which blew like a fresh wind over the ageing civilization of its time."

[2] See, for example, McKown, *Extracurricular Activities*; Stanforth, "A Study in Social Attitudes of a Group of High School Boys and Girls"; in *School and Society*, vol. 26, pp. 723–26; Sturtevant and Flemming, "Extra-Curricular Activities from the Viewpoint of the High School Girl"; in *Teachers College Record*, vol. 28, pp. 884–89; Terry, "The Social Experience of Junior High School Pupils"; in *School Review*, vol. 35, pp. 194–207, 272–80; Uhl, *Principles of Secondary Education*, pp. 125–35.

ous sorts. We should not fail to note, however, that these tendencies do not die out with the completion of adolescence. Dean Clark,[1] at the University of Illinois, says:

> Men, young and old, are social animals. All of us like to join things. It is as difficult for me to refuse an invitation to become a member of a club or a fraternity or an organization as it is to resist the seductive talk of a book agent when he spreads his attractive wares before my eyes. I feel like a hero if I can summon the courage to turn him down. . . . I am not arguing, however, that there is always profit in joining. Boys feel very much about joining things as men do. When they go into a high-school fraternity, they are but imitating their fathers or their older brothers in college each of whom, no doubt, has his club or his fraternity.

Value of social organizations in high school. Social organizations in high school, like other extra-curricular activities, are not necessarily of value. The majority of educators probably believe that they either are or can be of value to high-school students. We share this general belief. Yet, clear-cut, conclusive evidence proving their value has not been collected and organized so that we may know the limits within which their worth probably lies. The experience of many high schools with secret fraternities has been such as to incline many educators familiar with secondary education to regard them as definitely subversive of the best interests of high-school students, and has led to state legislative enactments debarring them from many public secondary schools. There is also some evidence[2] that recreational activities learned at school are largely given up upon leaving school; yet the value of any school training for leisure is determined partly by its permanence or continuing to be effective after one's school days are over.

We have evidence from a few case studies indicating the

[1] Clark, T. A., *The High School Boy and His Problems*, p. 115.

[2] Cleveland Survey, *Education Through Recreation.*

value of these activities in resolving the adjustment difficulties of certain adolescents. Clinical workers probably have a great deal of material which could be organized to show which activities are useful in certain specified cases and which ones are not useful. Here is a problem upon which careful research is needed. We believe that extra-curricular activities can have positive value, but that wise discrimination is needed to adapt them to individual needs. Indiscriminate mass treatment, based upon the assumption that all such activities are *per se* valuable for every adolescent, is unwise and should be replaced by definite careful attempts to differentiate them according to individual needs.

5. *Intellectual and æsthetic interests*

Reading interests. As a sample of the varied intellectual and æsthetic interests of adolescents we have selected their reading preferences for brief consideration, and for two reasons: first, because of their importance; and second, because they have been studied quite extensively. Reading interests derive their importance from the rôle which they may play in the use of leisure time. It is important that children form a taste for reading excellent literature, since a mere liking for reading does not insure the reading of desirable materials. By noting the books and magazines which boys and girls like at the beginning of the teens, and again a few years later, we may be able to discern the changes in the qualities and characteristics of their reading preferences. We make no attempt to discuss methods of developing appreciation since such problems do not belong in this volume. In a later section we do mention a few obvious general principles which are applicable.

Books preferred by high-school pupils. Jordan [1] tabulated and analyzed the reading preferences of nearly five

[1] Jordan, A. M., *Children's Interests in Reading*, 1926.

TABLE 30. THE MOST POPULAR BOOKS AMONG HIGH-SCHOOL BOYS

(Jordan, 1926)

The numbers after the titles indicate relative popularity

Ages 12–13 Number of boys 311		Ages 14–16 1147		Ages 17–18 434	
Boy Scout Series	47	Zane Gray's Works	397	Zane Gray's Works	116
Zane Gray's Works	38	Call of the Wild	144	Call of the Wild	83
Call of the Wild	29	Treasure Island	110	Ivanhoe	42
Treasure Island	20	Tom Sawyer	104	Huckleberry Finn	42
Huckleberry Finn	18	Tarzan Series	78	Tom Sawyer	34
Tom Swift Series	14	Tom Swift Series	51	Treasure Island	33
Penrod	11	Penrod	47	Tale of Two Cities	31
Tom Sawyer	11	Covered Wagon	42	When a Man's a Man	28
Tarzan Series	7	Last of the Mohicans	40	Boy Scout Series	16
Driven from Home	6	Rover Boy Series	20	Trail of the Lonesome Pine	14
Rover Boy Series	6	White Fang	17	David Copperfield	14
Last of the Mohicans	6	Robinson Crusoe	16	Lorna Doone	13
Kidnapped	6	Boy Scout Series	15	Freckles	12
Motor Boy Series	6	Ivanhoe	14	Little Shepherd of Kingdom Come	12
Robinson Crusoe	5	Sea Hawk	13	Shepherd of the Hills	11
Billy Whiskers	5	Kazan	11	Lady of the Lake	11
Ivanhoe	4	O. Henry	11	White Fang	11
White Fang	4	Ben Hur	11	Tom Swift Series	11
Robin Hood	4	Kidnapped	11	Sea Hawk	10
Radio Boy Series	3	Huckleberry Finn	11	Tarzan Series	10

TABLE 31. THE MOST POPULAR BOOKS AMONG HIGH-SCHOOL GIRLS

(Jordan, 1926)

The numbers after the titles indicate relative popularity

Ages 12–13 Number of girls 434		Ages 14–16 1860		Ages 17–18 665	
Girl of the Limberlost	32	Zane Gray's Works	252	Zane Gray's Works	71
Little Women	31	Little Women	123	Girl of the Limberlost	65
Pollyanna	29	Pollyanna	81	Tale of Two Cities	49
Zane Gray's Works	24	Freckles	81	David Copperfield	35
Freckles	23	Anne of Green Gables	67	Little Women	32
Little Colonel Series	18	Little Shepherd of Kingdom Come	53	Anne of Green Gables	26
Fairy Tales	17	Girl of the Limberlost	54	Shepherd of the Hills	25
Rebecca of Sunnybrook Farm	16	Laddie	51	Little Shepherd of Kingdom Come	25
Elsie Dinsmore	15	Graustark	42	Freckles	23
Laddie	14	O. Henry	40	When a Man's a Man	22
Anne of Green Gables	12	Seventeen	40	Ivanhoe	22
Boy Scout Series	10	Tale of Two Cities	40	Ben Hur	22
Little Pepper Series	8	To Have and To Hold	32	Trail of the Lonesome Pine	19
Ben Hur	7	Silas Marner	31	Call of the Wild	18
Secret Garden	7	Covered Wagon	30	Lorna Doone	18
Heidi	7	Scaramouche	26	O. Henry Series	17
When Knighthood was in Flower	7	David Copperfield	24	Eyes of the World	16
Seventeen	6	Treasure Island	23	Lady of the Lake	14
Eight Cousins	5	Huckleberry Finn	19	Little Minister	14
Black Beauty	5	Virginian	18	Laddie	12

thousand pupils in several high schools, arranging the books according to popularity at ages twelve to thirteen, fourteen to sixteen, and seventeen to eighteen. His results, shown in Tables 30, 31, and 32, indicate considerable overlapping of interests among the youngest, oldest, and middle groups. Other studies [1] indicate the same thing.

Qualities and characteristics of books liked at different ages. Jordan divided the preferred books into certain classes. He found that girls at twelve and thirteen were interested most in juvenile fiction, adult fiction, and adventure; at fourteen to sixteen, adult fiction, adventure, and juvenile fiction; at seventeen and eighteen, adult fiction and

TABLE 32. RELATIVE POPULARITY OF CERTAIN CLASSES OF BOOKS AMONG HIGH-SCHOOL STUDENTS
(Jordan, 1926)

AGE	12–13		14–16		17–18	
	Boys	Girls	Boys	Girls	Boys	Girls
Number	75	98	471	664	151	184
	Percentage		Percentage		Percentage	
Adult fiction	11.2	35.1	13.8	48.6	24.2	56.9
Juvenile fiction	2.6	38.9	2.5	17.6	1.9	9.2
Adventure	61.6	20.2	63.3	25.4	52.8	26.6
Biography	2.6	.6	2.3	.8	1.3	1.0
History	2.3	....	.5	....	.1	....
Poetry	.5	....	1.2	1.6	3.0	2.1
Science	....	....	.1	.1	.1	.1
Travel	....	....	.1	....	.1	....
Information	.5	.2	.6	....	.6	....
Humor	9.4	2.5	7.3	3.3	7.5	1.9
Miscellaneous	.3	.4	.1	....	.1	....
No choice	6.5	3.5	8.1	3.2	7.9	1.7
Total per cent	100.	100.	100.	100.	100.	100.

[1] See also Terman and Lima, *Children's Reading*, chap. 5; Uhl, *The Materials of Reading*, chap. 6; and other references on reading interests at the close of the chapter.

adventure. Boys at twelve and thirteen, and again at fourteen to sixteen, were interested primarily in adventure, with some liking for adult fiction and humor; at seventeen and eighteen adventure was still the most popular, but it had lost some of its hold of the preceding years, whereas adult fiction had increased in popularity until it was one half as popular as books of adventure (see Table 32).

Terman and Lima's [1] results also indicate an overlapping of reading interests which we would expect to find at different ages. Differences in intelligence, experience, and maturity account for much of it. The brighter child often is more mature in his reading interests than the less gifted ones. We have summarized, in Table 33, Terman and Lima's results for ages eleven, fourteen, and sixteen and over. In general, we should note that Jordan's study of many more high-school students indicates a greater permanence and less abrupt changes in reading interests than does that of Terman and Lima.

Uhl [2] sought also to ascertain the qualities of books which interest high-school students. Nearly seven hundred pupils in Grades VII to XII stated the characteristics which they liked in books. Their replies indicate that the most interesting qualities of books read out of school are as follows: (1) interesting or dramatic action, adventure, 32 per cent; (2) interesting information, 18 per cent; (3) realism, 9 per cent; (4) humor, 7 per cent; (5) nature and outdoor life, 8 per cent; (6) fine literary style, 6 per cent; (7) child life, 6 per cent; (8) moral, 4 per cent; (9) interesting characters, 3 per cent; (10) supernatural or mystery, 3 per cent; (11) animal life, 2 per cent; (12) pathos, 2 per cent; (13 and 14) romance and description, 0 per cent.

The development of reading interests during the high-school years. What then shall we say in conclusion about

[1] *Op. cit.* [2] *Op. cit.*, chap. 6.

TABLE 33. KINDS OF READING MATERIAL LIKED BEST AT AGES ELEVEN, FOURTEEN, AND SIXTEEN

(Summarized from Terman and Lima)

BOYS	GIRLS
AGE 11	
Revel in adventure and mystery. Interest in science and invention increases. Less interest in animal and nature stories. About one fourth show interest in books on mechanics, electricity, aircraft, or exploration. No interest in love stories.	Chief interest in stories of home and school life. Still interested in fairy tales and fantastic stories, and animal and nature stories, especially flowers and gardens. Also like adventure stories. No interest in scientific or mechanical books. Begin to be interested in love stories.
AGE 14	
Increased number of magazines read. Waning interest in adventure. Interest in athletics and inventions. Interest in technical mechanics more prominent, also in biography, history, travel, and jungle stories.	Increased number of magazines read. Prefer adult books — choose much sentimental fiction. Occasionally an adventure story. Little interest in juvenile books. Still interested in poetry.
AGE 16 AND OVER	
Little difference from adult reading. Interests more individual and specialized. No trends of group interest corresponding to their earlier "fairy tale age" or "hero-worship age."	

the development of reading preferences during the teens? In the first place, the great diversity among individuals is noteworthy, indicating such a wide range of individual differences that it is difficult to characterize any particular age as dominated by interests in a specific kind of material. Furthermore, some types of material are interesting for several years; the individuals' liking for a particular kind may persist into adult years. Abrupt changes from one year to the next are not very common. As new interests are added to those already present, and as some of the latter be-

come weaker, a shift occurs in the relative strength of various ones. In a few years the accumulating changes are quite noticeable; some interests have become quite weak or almost neutral, whereas others are much stronger, as we have seen in the foregoing tables. Investigation of magazine preferences [1] corroborates the results obtained from studying interests in books.

6. *Vocational interests*

The interest-tests discussed earlier in this chapter utilize the individual's likes and dislikes for various activities and situations, rather than only his expressed preferences for certain occupations. By careful empirical try-out the interests are determined which have differentiating value for success in certain occupations. This is a promising line of attack, and further research may yield very valuable results.

Of what value are the vocational preferences of the young adolescent? How many boys and girls have definite choices at the beginning of adolescence? Are they related in any significant way to vocational aptitude? Are they relatively permanent, or are they fleeting and changeable — a mere fancy of the moment? Do they have any value for guidance? Further research is needed to give final answers to these questions, but data are available upon which we may base tentative conclusions.

Proportion of adolescents having vocational preferences. Many persons believe that boys and girls at the beginning of puberty have little idea of what occupations they want to follow. Their belief is not based upon close observation or the results of careful investigation, but is derived from considerations of the fourteen-year-old's scant experience, inadequate information, and assumed lack of concern about occupations. Investigation of the vocational preferences of

[1] See, for example, Jordan, *op. cit.*

junior and senior high-school students indicates that the vast majority of them have in mind the occupations they think they want to follow. Franklin [1] had 1467 first-year pupils in the junior high schools of Baltimore fill out a questionnaire which included the following question, "What one occupation would you most of all like to go into when you leave school?" Of the boys 98.3 per cent, and of the girls 98.1 per cent indicated preferences. Less than two per cent had no choices. McCracken [2] also submitted a vocational-inquiry card to more than twenty thousand high-school pupils in Cincinnati, Denver, and other places in Colorado. On the average from 84 to 94 per cent of the pupils indicated occupational preferences in answering the question, "What do you wish to do to earn your living when you have finished school?" The proportion having preferences was slightly larger in the junior high schools than in the senior high schools.

Many boys and girls at adolescence are thinking seriously about what they want to do to earn a living. Very few facetious answers are given to the vocational preference questionnaires. Vocational counselors usually find high-school students quite eager to find out about the occupations in which they are interested. In personal interviews with each of the 137 pupils of a class entering junior high school the writer inquired about their vocational ambitions. All but four (97 per cent) had preferences. In every case serious, interested responses were made; frequently, the pupil in turn asked many questions to secure additional information. Girls as well as boys were carefully considering and weighing the matter. Many a boy or girl who was inclined to a particular vocation was nevertheless thinking of

[1] *The Permanence of the Vocational Interests of Junior High School Pupils.*

[2] McCracken and Lamb, *Occupational Information in the Elementary School*, chap. 3.

one or more others, and was trying to decide which one really was the best to follow. This is to be expected. As a result, however, the youth's actual preference may not be quite so clear-cut and definite as the bald statement of it on a blank might lead one to suppose. A very bright pubescent boy of chronological age twelve years six months, with a Stanford-Binet mental age of eighteen years eight months, was trying to decide between law, architectural, and chemical engineering. He had a very serious, intelligent, critical attitude, was seeking information on his problem, and was trying to evaluate it, although if one were to see him playing with a group of boys or engaged in some other recreational activity, one might wonder whether a serious thought ever entered his head.

On the other hand, some of the vocational preferences, although *bona fide*, were clearly based upon experiences of less than a month in junior high school. Eight girls said they expected to teach physical education. Knowing that their instructor in physical education was an excellent teacher, very popular, attractive, and of a pleasing personality, the writer sought to find out when these eight girls had decided to become teachers of physical education. Six of them had made the decision as a result of being in the physical education class in junior high school.

Permanence of vocational preferences. Granted that by the time of puberty nearly nine tenths of the boys and girls have some idea of what they want to do to earn a living, it does not necessarily follow that their preferences are either permanent or well-founded. Investigation has shown that they are relatively permanent for a year or slightly longer — i.e., for the intervals of time investigated. Franklin [1] found that the lapse of a year left 61.6 per cent of the boys, and 70.8 per cent of the girls, unchanged in their occupational

[1] *Op. cit.*

choices. McCracken [1] found the preferences of senior-high-school students more permanent than those of pupils in the junior high school, as one would reasonably expect them to be; the percentages of permanency after a year were 56 per cent and 50 per cent, respectively. Franklin presents evidence showing that the more intelligent boys have the greater permanency of choice, whereas among the girls, with the exception of the decile lowest in intelligence, the brighter ones' choices are less permanent, as shown in Table 34.

TABLE 34. PERMANENCY OF VOCATIONAL INTERESTS OF JUNIOR-HIGH-SCHOOL PUPILS AFTER AN INTERVAL OF ONE YEAR, ACCORDING TO LEVELS OF INTELLIGENCE
(Franklin)

DECILE IN INTELLIGENCE*	PERCENTAGES OF PERMANENCY		
	Boys	Girls	Total
1	65	63	64
2, 3	64	69	67
4, 5, 6, 7	60	73	68
8, 9	60	76	71
10	55	54	54
Total	61.6	70.8	66.7

* Mean of Illinois and Mentimeter group tests.

Furthermore, the activities and experiences of the school seem to modify city pupils' vocational interests more than do those of the summer vacation, Franklin's study showing greater permanency over the summer vacation than during a corresponding period of time while school was in session.

Greater importance, however, attaches to permanence for several years, especially until actual entrance upon the occupation. Here our information is less extensive. Proctor's [2] re-check on 930 high-school pupils, four years after his

[1] *Op. cit.*

[2] *Use of Psychological Tests in Educational and Vocational Guidance of High School Pupils*, chap. 6.

first investigation of their educational and vocational plans and ambitions, indicates that the early preferences were greatly modified. He found 272 of the original group were at work. Thirty-two per cent of them (16 per cent of the boys and 46 per cent of the girls) were engaged in the same occupations as those for which they had expressed a preference four years previously. This proportion compares very favorably with that of Franklin's group. After one year, one third of his group had changed their preferences; whereas after four years one third of Proctor's group were actually following the occupations for which they had expressed a preference four years earlier. Probably the changes are more rapid during the earlier years of high school.

Functioning of vocational interests in the choice of high-school courses. Although the young high-school student may be mistaken in his choice of an occupation to be followed when he leaves school, and despite the possibility of his changing his choice in a few months or a year or two, his preferences nevertheless do seem to have some significance. One of the most important decisions the junior-high-school pupil has to make is the selection of the course he is to enter. Do his vocational interests function at this point? Evidently they do, because 92.2 per cent of Franklin's junior-high-school pupils selected and enrolled in courses which were preparatory to the occupations for which they had expressed a preference.

The influence of the life-career motive. The life-career motive is often a powerful one, representing a dominant purpose. It may be a vital, organizing principle in certain phases of the development of personality. Boys often eagerly seek information along lines of the occupations they want to follow. Accordingly, the problems of providing suitable vocational information and intimate vocational contacts are of great importance in adolescent guidance and

control. The chief value of such information and contact lies, however, in facilitating wise vocational choice, since investigation [1] has shown that boys who had chosen vocations did no better school work in proportion to their ability than the boys who had not made their vocational choices; i.e., the life-career motive had no effect upon the quality of work done in high school. This was probably due to the fact that vocational interest is specialized and does not pervade all phases of the youth's life, and partly to the further fact that most of the high-school subjects have for students no clear-cut, obvious connection with the occupations in which they are interested. Sometimes a very strong vocational interest disinclines students to put forth much effort upon subjects not clearly related to the preferred vocation.

7. *The rôle of interests in adolescent development*

Four functions of adolescent interests. Aside from their prognostic value in educational and vocational guidance which we have previously discussed (Section 3 of this chapter), interests may serve at least four important functions in the development of the adolescent.

1. *Interests serve an exploratory or "try-out" function.* They lead to activity, to experience. The youth who is interested in an activity tends to engage in it. Thus his interests lead him to sample many activities and to acquire knowledge of them, often under circumstances favorable to their correct appraisal.

2. *A wide range of wholesome interests tends to insure breadth of experience and of personality.* Under normal circumstances the youth who has many wholesome interests is in little danger of developing a narrow, one-sided person-

[1] See, for example, Kefauver, "Life-Career Motive and Its Effect on High-School Work"; in *School Review*, vol. 34, pp. 426–30.

ality. The desirability of building up many useful interests and appreciations is obvious.

3. *A wealth of interests facilitates substitution in case of thwarting, and is an aid to mental health.* As we shall see in Chapter XV, thwarting and conflict of desires are common causes of functional mental disorders. A wealth of desirable interests enables the youth, when thwarted, to turn more readily and with less stress and strain from one interesting activity to some other one. The youth with few interests is likely to find substitution a more difficult task.

4. *Intense abiding interests in a few things are desirable for efficiency.* The greatest achievement is possible only when the individual has a strong abiding interest in the task he is performing. Intense effort for a long period of time is required. In any line of endeavor, an individual is likely to find hard tasks which, in and of themselves, are more or less disagreeable. A strong interest in his work will help carry him over many irksome subsidiary tasks involved in it. Without such interests, achievement is won at a needlessly great cost in strain and effort. Deep, abiding interest enables an individual to work not only with less stress and strain, but also with greater absorption and concentration upon the task in hand, being thus a prerequisite to greatest efficiency. Deep, abiding interests, however, imply ability to do the task. Educational and vocational guidance, therefore, must seek to know the youth's aptitudes, for only in accordance with them may abiding interests be developed. Interests based upon superficial experience may well be utilized for their exploratory value, and thus be an aid in determining more permanent ones.

8. *Means of developing interests among adolescents*

Three general considerations. The means which are effective in building up wholesome interests during the years

following puberty are obviously none other than those which are efficacious during pre-adolescence and adult life. They involve the laws and principles of learning, discussed in Chapter IX. We should note, however, three general considerations.

1. *Contact with a wide range of desirable activities.* The first condition, fundamental to developing interests, is contact with the activities in which interest is to be developed. Genuine interest depends upon experience of the specific things and activities. Thus the adolescent is not likely to have much interest in a certain type of literature if he never reads it or hears it read. There is much truth in the statement, attributed to Elbert Hubbard, that "The people who are not *up* on a thing are usually *down* on it." Similarly, little interest is likely to develop in physics, for example, if laboratory work and class work are largely "personally conducted tours" by the teacher, with the pupils' initiative, point of view, and problems largely disregarded.

A broad program at school and out of school is useful in building up a wide range of interests.

2. *Activities proportionate to capacities.* Since interests depend so much upon aptitude, it follows that a second condition necessary for developing sound interest is the arrangement of activities in accordance with the abilities of the youth who is to have contacts with them. The youth can have no genuine interest for a subject in school or for some other activity or occupation which is far beyond his powers, although, of course, he may wish at times that he were successfully engaged in it. He can, however, recognize the value of useful lines of work in which he cannot successfully engage, without being disturbed by (or sometimes, even conscious of) his inability to succeed in them. If he is working at congenial tasks, which, with reasonable effort, he can successfully perform, he is likely to have little time or in-

clination to be concerned over things which are beyond his abilities.

Since the secondary school, especially the junior high school, serves an exploratory or "try-out" purpose, considerable flexibility is needed, so that pupils who attempt subjects or courses for which they have insufficient aptitude may be transferred to ones in which they may succeed. With the development of more precise means of appraising various sorts of ability, classification and guidance will be more effective and fewer youths will be misfits in school. Yet there will continue to be cases in which parents will insist that the child shall pursue courses for which he does not have the requisite ability. Shall the school allow him to enter courses in which failure is reasonably certain, or shall it, through a system of prerequisites (such as marks in certain subjects, or scores on certain prognostic or achievement tests) refuse him admission to such subjects? These are not questions for psychology to answer, although it does indicate two considerations which are involved in the effect of failure upon the personality of the youth, namely: (1) failure tends to discourage him, and may help build up an inferiority attitude; and (2) failure along one line may direct his efforts to other lines. The younger and the more sensitive the youth, the greater is the first effect. As a general rule, prevention of failure is desirable. Success is a positive stimulus, and when earned, is not fraught with so many possible undesirable consequences.

3. *The presence of conditions insuring satisfaction.* In trying to develop the adolescent's interest in certain things and activities, it is highly important that his contacts be satisfying, so that he will be inclined toward them. Force or external compulsion is likely to result in dislike. Often some devices or "tricks of the trade" may be used to get the youth to have some actual experience of the object, situa-

tion, or activity, upon the assumption that he will like it, if he but sees what it is like. A better procedure is to provide that organization and presentation of it whereby the student needs it to solve some problem or answer some question with which he is concerned.

To insure the development of wholesome interests we must provide the conditions under which the adolescent comes into satisfying contacts with a wide range of desirable activities which are proportionate to his capacities, and into annoying contacts with undesirable or unsuitable activities.

PROBLEMS FOR DISCUSSION

1. How may education enrich the recreational life of the adolescent?
2. Find out the amusements of a group of high-school students.
3. Motivation of school work in the case of pupils below the average in mental ability.
4. Relation between interest in various subjects and achievement in them.
5. What definite training should there be for leisure time besides that given by extra-curricular activities?
6. Investigate the reading interests of a group of secondary-school students.
7. Developing appreciation of good literature.
8. High-school guidance of leisure time in out-of-school hours.
9. What is the effect of extra-curricular activities on scholarship?
10. Extra-curricular activities for the solitary or moody child; for the retarded pupil.
11. What kinds of plays and operettas are suitable for use in junior high school? In senior high school? What kinds are unsuitable?
12. Actual and possible uses of school assemblies.
13. Useful habits, attitudes, and ideals developed by school clubs. Dangers in extra-curricular activities.
14. What is the relation between students' recreations and amusements outside of school hours and their success in school work?
15. "Our school clubs meet during school hours and many chil-

dren feel that a club is another school subject and all interest is lost." What are possible causes? What remedies might be helpful?

16. Prepare a list of books suitable for boys in junior high school to read; for boys in senior high school; for junior-high-school girls; for senior-high-school girls?
17. To what extent is it necessary to adapt extra-curricular activities to the needs of each student? How may this be done?
18. What can parents do to help boys and girls in the teens develop wholesome interests?
19. How can the school and home help youth develop significant vocational interests?

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CHAPTER XI

MORAL AND RELIGIOUS DEVELOPMENT

One difficulty in the scientific treatment of the moral and religious development of adolescents is the lack of suitable means of measuring accurately the traits involved, so as to know either the changes occurring from one age to the next or the specific modifications resulting from diverse forms of training and instruction. For some time research has been directed to the task of devising the needed means of measurement along these lines, and once they are available we may hope for a more adequate literature on the subject. Considerable evidence, however, is at hand from careful observation, and from using the imperfect means of measurement now available.

1. *The meaning of morality*

Morality neither conformity nor good intent alone. While *morality* comes from the Latin word *moralis*, meaning manners, customs, or conduct, and implies behavior which is in accord with the standards of the group to which the individual belongs, yet mere conformity to such customs does not of itself signify much about the moral character of the conforming individual. Conformity as such is an inadequate criterion, as are also, on the other hand, good intentions which remain merely good intentions. Morality is not simply a regulation of social relations — "an external code for the orderly conduct of life" — although it does include a code which powerfully influences conduct.

Conduct prompted by inclination to act for the common good. We think of the individual of high moral character as one whose conduct is intentionally for the common good.

Any view which omits this conception leaves out of account a most intimate important element. The task of home, school, church, and other agencies directly concerned in guiding and stimulating youth's moral growth is effectively performed only if a moral code comes to have a unique impelling authority in shaping his ideals and conduct — an authority whose force comes from within the individual rather than from without. We do not mean, however, that this inclination or intent is an absolute or ultimate thing — a condition of the organism not subject to modification by the outer forces which play upon the individual. On the contrary, it has a developmental history similar to that of any habit. Moreover, the laws of its development are the same as those which govern the formation of other conditioned responses; that is, the laws and principles of learning which we have discussed in Chapter IX.

What we are insisting upon is this: Mere conformity to essential features of conduct codes, valuable as it is, falls short of being an adequate criterion of the development of moral character. It neglects an important condition in the person who is being trained (that is, his mind-set, attitude, or purpose), since it does not necessarily include that important law of learning, known as the law of effect, of satisfaction and dissatisfaction. We are insisting that moral character involves not only behavior for the common good, but also those conditions in the organism which incline him thus to act of his own accord (without external compulsion).

It may be objected that the pragmatic test of character is conduct, and that *acting* in accordance with essential items of conduct codes is all that is necessary. We recognize the force of this argument, and agree that nothing can take the place of overt action for group welfare; but, at the same time, we believe that the best insurance that an individual will continue to act for the good of the

group is his finding satisfaction in so acting and annoyance when he acts otherwise. Now satisfaction or dissatisfaction may flow from the external concomitants of a response, as when desirable behavior is rewarded by social approval or in some other way, or when undesirable behavior leads to social disapproval or some other form of punishment. Satisfaction (or dissatisfaction) may also result from the response's being (or not being) in accord with the more permanent inclination, set, or purpose of the responding individual. In the latter case we have a more firmly fixed element of his disposition than if external reward or punishment alone were the impelling force motivating his behavior.

We recognize the fact that in building up many habits and other constituent elements of moral character, external control and guidance are necessary; but, if guidance and control are wise, the youth will be habituated not only in making certain responses, but also in enjoying them or at least in not being averse to making them. The trouble with constant external compulsion is that the youth is not learning self-control. His own inclinations, passions, and desires are regulated from without. True freedom he will never have. His attitude toward what he does for the welfare of the group will be at best that of indifferent or neutral compliance; and, at the worst, an active, open, personal, inner opposition with the least conformity possible under the existing rules, customs, and public opinion which constitute the external authority at the time.

An important characteristic of the moral development of the immature is the transition from external to internal authority as the sanction for many conduct responses. This inner desire or inclination to act for the common good is a *sine qua non* of true moral character. Courtesy and kindliness are desirable, but an individual may be courteous merely because it is the "proper thing" to do. One may be

honest because, selfishly considered, it is the best policy. Self-interest may be the real motive, and the individual's conduct may be shot through with a shrewd, cold, calculated, selfish weighing of alternatives which results in conduct for the common good when self-interest is also served or when such conduct cannot be avoided, but in anti-social behavior on all other possible occasions.

External authority seems to be necessary. Laws, rules, regulations, and other forms of public opinion and social taboos serve the purpose of acquainting the developing individual with group standards and of insuring his action in accordance with them. By the time he is mature they should be unnecessary to secure right conduct, but for many adults they do seem necessary to prevent anti-social behavior. The accumulating mass of such formulated regulations and their apparent necessity are, in some respects, valid evidence of the need of a more effective type of moral training for the increasingly complex life of the times.

2. *Psychological characteristics of moral character*

Dewey's analysis. According to Dewey,[1] moral character embraces the following psychological characteristics: (1) force or energy, (2) intellectual judgment, and (3) emotional responsiveness. Driving force or energy is that quality of the individual by virtue of which he overcomes obstacles and carries enterprises through to completion. It is an essential quality because the consummation of socially valuable purposes so often requires persistent endeavor in the face of strong opposition. Not only is energy necessary to secure overt action, but it must be properly directed as well. Life presents complex, intricately tangled situations, to which the best responses are not necessarily the simplest or the most obvious. Accordingly, the individual needs a keen

[1] *Moral Principles in Education.*

intellect, trained to analyze the complex conditions confronting him and to evaluate a wide variety of possible responses, so that he may know what are the most suitable ones in a given situation. In addition to these two qualities, a third one is essential to insure his making the response which his judgment tells him is appropriate. He must have an emotional responsiveness inclining him to do the things he knows are best and giving him a strong impulse to do them.

If now he lacks the first characteristic, he is the sort of person who can analyze a complex situation into its significant aspects, weigh various possibilities, and determine the line of action best suited to attain certain specific results; he also feels keenly the desirability of making a certain response, but he goes no further toward meeting the situation than knowing and feeling. He hasn't the force to do that which he knows is best and which he really would like to do. He knows, and feels, but makes no overt action.

If he has the first and third traits, but lacks keen intellectual judgment, he is the impulsive, forceful man whose intentions are good, who really does things, but not necessarily the things which are best in that situation; in fact, his responses may be decidedly inappropriate. A simple illustration will suffice to make this point clear. He sees a beggar on the street or the beggar comes to his door. The appearance of poverty or physical handicaps arouses an impulse to give assistance and he may immediately give the beggar money. Yet that may be precisely the ill-advised thing to do, because it may help confirm the beggar in his begging and not help him to help himself. If the community has some kind of associated-charities organization that makes a careful investigation of all such cases, the impulse to give had better lead him to make his contribution to the associated charities, especially in the cities, where he is not likely to know anything about the beggar's merits.

If force of character and sound judgment are present, but emotional responsiveness is lacking, the man is likely to be cold, indifferent, perhaps hard and inflexible in his dealings with others. Referring to this delicate personal responsiveness, Dewey [1] says:

> Indeed, good judgment is impossible without this susceptibility. Unless there is a prompt and almost instinctive sensitiveness to conditions, to the ends and interests of others, the intellectual side of judgment will not have proper material to work upon. Just as the material of knowledge is supplied through the senses, so the material of ethical knowledge is supplied by emotional responsiveness.

Manifestly any appraisal of an individual's character must consider these three characteristics. The moral growth of adolescents involves the proportional development of these three qualities as part of personality, as we see more specifically in the following section.

3. *Constituent elements of moral character*

Moral character, broadly considered, includes the traits found in the good citizen, and a comprehensive program of moral training is approximately the same as education for citizenship. The constituent elements may be divided into three or four groups, such as habits or skills, ideals, and knowledge, each of which in turn embraces many more specific conduct response-units.

Habits. Many life situations occur over and over with great frequency. While they may be slightly different from similar previously occurring ones, yet in many respects they are essentially the same, so that the appropriate responses are not materially different from time to time. Obviously, then, an economy in the development of character is effected by forming, in each case of the sort just described,

[1] *Moral Principles in Education*, p. 52.

that definite, well-established connection between situation and response, called habit. The reader can readily prepare an extensive list of habits which the adolescent should possess. His social effectiveness depends in large measure upon his having many of them formed so well that the suitable responses seem to follow almost automatically from the situations. Such simple things as orderly entrance to and exit from public buildings, giving right of way in pedestrian or vehicular traffic, habits of courtesy, kindness, fair-dealing, unselfishness, coöperation, respecting the rights of others, bearing responsibility, etc., illustrate the fundamental importance of habits in character development.

Shakespeare says, "Happy is the man whose habits are his friends," and the Duke of Wellington is alleged to have answered a query about habit being second nature by saying it was ten times nature. Whether the Iron Duke is correctly or erroneously quoted is of no moment now, but the need and value of an extensive set of habits can hardly be overestimated, such a large proportion of human conduct do they embrace.

How habits should be formed. Present knowledge of the psychology of learning indicates that habits should be formed in the way (and as nearly as possible in situations like those) in which they probably will occur, since they will then be better fitted into the total dynamic organization of the individual's traits. Real, vital activities are an important means. Both repetition and the law of effect are to be used. Responses resulting in (or accompanied by) satisfaction become more firmly connected with their stimuli, as we have shown in Chapter IX. Any program of moral training that fails to utilize the law of effect is to that extent wasteful and ineffective.

Responses are often secured in such a way as leads to their later inhibition. They are secured through external con-

trol, but the responding individual dislikes more and more to make them. Once the outer compulsion is removed the response is soon modified. Now it is true that the individual for various reasons may temporarily dislike making certain responses which are of such great importance that some form of external compulsion may be necessary and advisable to insure adequate habituation; but we must be very critical of any program or method of training which disregards such important factors as the interest and coöperation of the person being trained. The belief that lack of interest is an inherent element in habit formation, or is at least indifferent in its effects, is pernicious and may lead teachers and parents to accept and tolerate as permanent a condition which usually can be justified only on the grounds of its being clearly temporary. In emergencies at home or at school the best use of the law of effect may have to be held in abeyance for the time being, but we should clearly recognize the unusual nature of emergencies. Even then, however, wisdom, skill, self-control, and experience may enable those directing the adolescent to use this fundamental law of learning so skillfully that the youth through his inmost desires is inclined toward the desirable reaction.

Knowledge. Knowledge is a basic element in moral character, as we have seen in Section 2 of this chapter. The complexity of modern civilized life is so great that the citizen needs much knowledge and information on a wide variety of present-day economic, civic, and moral problems, if he is to discharge his obligations satisfactorily. Knowledge is not all of the same social significance, and that of higher value should be widely diffused. A continued critical evaluation of the facts and information to be acquired by the youth is essential to placing due emphasis upon the parts having various degrees of social worth. In a political democracy accurate knowledge of contemporary issues is

essential for all citizens, so that they can participate intelligently in the solution of problems. The secondary school cannot discharge its full obligation in training its students if it fails to bring to their careful consideration the major problems confronting the nation at the present time.

While it is urged (and we recognize the force of the argument) that high-school students are immature, do not have the perspective and sound judgment that come with greater maturity, and that therefore they are not competent to consider, or it is inadvisable for them to consider such vital issues as the causes of poverty and crime, of political corruption and of the faulty administration of justice, the conflict between capital and labor, the means of conserving and developing economic power for the general social welfare instead of exploiting it for individual ends, or various problems of international relations such as the elimination of war, yet the fact remains that the highest social welfare in a political democracy depends upon intelligent informed public opinion — is contingent upon its citizens' having precise information on such questions. The tragedy of ignorant public opinion is that its results may be just as pernicious as if due to sinister intent.

Furthermore, some of these vital questions are no more abstruse and complex than many of those heretofore included in the history and other courses in high school, while they have an added interest and appeal from the fact that they are live, present-day issues. Nor must we overlook the further fact that high-school students represent very largely the best intellectual ability of the population of these ages and are really capable of understanding much of these problems. It is, of course, highly desirable that bias, prejudice, and half-truths be avoided, and that the student recognize the limitations of his knowledge and be stimulated to seek further information. High-school students are competent

to understand much about public opinion, its nature, how it is formed, how it works, and the forces that modify and direct it; and since it is such a potent factor for good or evil, as many students as possible should be led to a knowledge of this powerful instrument. Instruction that leads the adolescent merely to store up the lore of the past is a wholly inadequate preparation for active participation in the affairs of the time.

Finally, if the secondary school neglects this essential instruction, by what agency will it be given? And when? We believe the high school can discharge its obligation for civic education only by including as part of its work this important task of leading its pupils to such a study of the vital contemporary issues as will give them the most precise available information that is suited to their understanding.

Training needed in finding pertinent facts. Not only must the adolescent acquire this socially indispensable information, indicated in the preceding paragraphs, but he must be trained in habits of finding it. This is no easy task. He may have good enough intentions, but he must be alert and skilled in finding the information which enables him to judge what is best for the common good. When the selfish interests of special classes or sub-groups clash, finding the truth on the controversial question is increasingly difficult, and the citizen is often baffled in ascertaining what is probably, in the long run, best for the entire group — assuming, of course, that he is free of prejudice and has not selfishly identified himself with the narrow interest of some special class. He may want to know, for example, the true implications of a proposed municipal franchise, but the whole matter may be so enmeshed in propaganda designed to win a selfish cause, rather than to conserve the general welfare of the municipality, that he is at a loss to know what is best.

When lines of cleavage are sharply drawn the obstacles

to *knowing* the truth are greatly increased — witness the "Books" and censored "news" issued by various governments during the World War, the fabrications of a political campaign, the "statements of fact" issued by the contending parties in an industrial dispute, or the difficulty of ascertaining the essential truth of a government's foreign or domestic policies even in time of peace.

Youth to be habituated to desiring and using the truth. Training the youth in ways of finding accurate information on vital questions, in collecting, sifting, and weighing evidence, is desirable, but it is equally important to habituate him in wanting to find the truth and in acting upon it, once it is ascertained. Here again the best insurance that he *can, will want to*, and really *will find and use* the truth in his conduct responses (whether they relate to the larger problems of civic life just discussed or to the less complex ones) is to provide as many situations as possible for such activities and arrange them so that the youth finds them significant, vital, and satisfying. If education is to serve its high function of helping to build a new and better social order, it must lead people to desire, know, and love the truth, and to make it the basis for unselfish action. We want to emphasize the need of training the adolescent to an openminded, impartial search for the truth upon vital questions. Unfortunately we find that the discussion of important current questions by adults too often "generates heat" rather than "light," the impartial search for the truth is abandoned, and highly emotional responses are made. According to Bertrand Russell, a "critical, undogmatic receptiveness is the true attitude of science."

The incident is told of some heated discussion of a controversial issue (the Irish question in 1920) by a group of high-school girls, probably of the Horace Mann school under the instruction of Mr. Hatch. One girl became very angry,

and her discussion indicated clearly as much, but with continued experience in studying vital questions she developed until she could discuss such questions more or less impartially. On her own initiative, toward the end of the year, she apologized to the group for her previous lack of control and angry behavior. Such training is vital, and the habits are formed effectively. Critical, unprejudiced, open-minded consideration of the important problems of contemporary life is of enormous importance — is so vital for the common good that far more attention should be given to cultivating this disposition than has been devoted to it in the past.

Appreciation of social heritage to be developed. Knowledge, especially that of the past, makes another important contribution to the social or civic development of the individual. If it is properly acquired, it is a powerful aid in developing that appreciation of our social heritage which all citizens should have. The adolescent needs to know and feel keenly the enormous debt the present generation owes to those which have gone before. Only in this way can he value rightly the priceless heritage he enjoys. Through the work, sacrifice, and suffering of our forbears we have our present comforts, conveniences, luxuries, political rights, moral and religious standards and freedom — in fact, all that separates us from the brute that man once was. An appreciation of this priceless gift should lead to a deep sense of personal obligation to pass it on to the next generation not only untarnished and undiminished, but increased and of still greater worth.

Robinson,[1] noting the general tendency to accept thoughtlessly the conditions of the times, says:

> In every age the prevailing conditions of civilization have appeared quite natural and inevitable to those who grew up in them.

[1] Robinson, J. H., *The Mind in the Making*, p. 57.

The cow asks no questions as to how it happens to have a dry stall and a supply of hay. The kitten laps its warm milk from a china saucer, without knowing anything about porcelain; the dog nestles in the corner divan with no sense of obligation to the inventors of upholstery and the manufacturers of down pillows. So we humans accept our breakfasts, our trains and telephones and orchestras and movies, our national Constitution, our moral code and standards of manners, with the simplicity and innocence of a pet rabbit. We have absolutely inexhaustible capacities for appropriating what others do for us with no thought of a "thank you." We do not feel called upon to make any least contribution ourselves.

Ideals. An ideal is defined by Gates as an idea, plus an impulse to action. It is best formed, as are habits, by providing situations in which the idea and the impulse eventuate in satisfying conduct. The individual experiencing some situation is conscious of certain elements in it in a certain way — it has a certain meaning for him. His perceiving, analyzing, judging, etc., may be accompanied by a feeling of pleasantness or unpleasantness, by an impulse to follow some line of action. The intellectual element may vary in effectiveness, as may also the impulse. He may not understand the event clearly; may, indeed, misunderstand it, or he may grasp its meaning completely. The impulse aroused by his intellectual appraisal of the event may be so strong in its impelling force that it is decidedly an emotional experience, or at the other extreme it may be so slight as to be scarcely perceptible. Individuals differ in the relative proportions of these two elements in a given situation. An individual's responses to different situations also are likely to involve these two elements in varying proportions, specific features of previous training as well as hereditary factors accounting for the variation.

Sometimes the impulsive element is called attitude, although this term is used by psychologists and educators to refer to a wide variety of things, such as muscular set or ad-

justment, neural set or readiness, motive or purpose, generalized conduct, and verbal acceptance or rejection. Practically all of the reactions which we would list as attitudes can be included under habits, ideals, and knowledge, or consolidations of these and their specific elements.

We need not make a list of ideals which the adolescent should form, because the teacher or parent can easily make a list of the more important ones. As a matter of fact, so many of them, if properly acquired, will lead to overt action that they really are intrinsic parts of the habits. Take, for example, such a desirable trait as relying upon orderly processes to attain group purposes. The people of the United States have an unenviable reputation among the nations of the civilized world for violence which manifests itself in the large number of homicides, the mob violence of race riots, lynchings, and floggings, and the destruction of life and property in industrial disputes. We need to form the *habit* of resorting to orderly means of settling social conflicts and solving civic problems. Here we see that if "the idea plus an impulse" really leads to overt action, and if the disposition of using orderly procedures instead of violence is really acquired, we have taken on another habit. We also know that if orderly processes are to be used, the individual must see and feel their necessity and efficacy. To secure a continued reliance upon them, their practical value must be insured through the attainment of other essential objectives already mentioned, such as the control of public opinion and resources for social ends, the honest, effective administration of justice regardless of poverty, wealth, social position, political influence, or class distinction. This means that the effectiveness of ideals and habits depends in part upon their organization into larger units or systems of response and that the efficacy of some is contingent upon the potency of others.

Ideals best formed in vital situations. Ideals, like habits, should be formed as often as practicable in real, vital situations in which the impulse to act may really lead the adolescent to make the response which he feels impelled to make. Ideals thus formed are likely to have a positive effect upon conduct. If moral training consists merely of lessons in morals — lessons in which clear analysis is made, impulses to right action are aroused, but no provision is made for desirable overt action — it will fall far short of the effectiveness it would possess if the conduct response had followed the two other phases. If the sequence is idea, impulse, and inhibition of overt action, and if adolescents are trained to it, then it is possible that they might have so much training that they would be less inclined to respond by overt action than if they had had less training, or had had more training with opportunities for overt action.

While the moral training of the adolescent has as one object inclining the youth to right conduct, yet so specific is learning that we can know little about the strength of his inclination unless it be tested by giving it an opportunity to lead him to some conduct response; nor, indeed, can we be sure without such a test that the training has gone beyond habituating him to know, feel, and inhibit the impulse to right action.

Direct moral instruction can serve a useful function, especially if it clears up misconceptions and puts the youth in such relation to significant features of situations that he not only understands them clearly, but has the right impulses aroused. This is a difficult task. The adolescent is sensitive, is usually timid about his feelings and impulses — at least about discussing or acknowledging them — and is quite likely to resent crude bungling attempts to moralize. Direct moral instruction alone is not enough. Moral character is built up through moral conduct as well. An ade-

quate program of moral training must be broad enough to include not only instruction which gives adolescent boys and girls a better intellectual grasp of important social-moral problems, but also a wide variety of activities through which they learn to enjoy doing socially useful things and actually get enough practice to become well-habituated thereto.

4. *Stages in moral development*

Non-moral, transition, and truly moral periods. Sometimes the conduct of infancy and childhood is regarded as unmoral or non-moral, the child merely conforming to the demands of those who have charge of his direction and control. Early adolescence is then considered the transition period during which the youth critically revamps his outlook upon life, sets up new standards of conduct, and begins to perceive and feel his personal responsibility to himself and to his ideals for what he does. Later adolescence and adult life, according to this three-fold division, are the period of true morality, the time when his conduct is regulated from within and when a definite personal responsibility for it is felt.

While such a classification has some value, it must not be supposed that personal sense of duty, ideals, and altruistic behavior are unknown before the teens, or that they suddenly appear at the time of puberty. If our previous analyses of the constituent elements and psychological characteristics of moral character are correct, it seems clear that a gradual development is taking place, often unobserved, but nevertheless present and observable; that for certain particular situations the transition from responses based upon outer compulsion to responses due to inner necessity — from selfish to unselfish motivation — may antedate puberty three or more years. The time of transition varies with the individual and the situation. It is not likely ever to be complete for all sorts of situations, and adults may be found who in

this respect have not "put away childish things," but make conduct reactions in which outer compulsion is the predominating motive.

On the basis of close observation and certain *a priori* considerations, it seems to the writer that moral growth is a continuous gradual affair, and not a matter of separate, sharply contrasted periods. Many habits are functioning daily in the conduct responses of pre-adolescents and are used without external compulsions; and many boys and girls have some truly moral ideals before puberty and make from time to time truly moral conduct responses. Moral growth normally continues many years after the dawn of puberty, as we see later.

Levels of conduct. McDougall, in his *Social Psychology*, refers to four levels of human conduct which form a good background upon which to study the problems of adolescent moral growth. Without following him too closely, we may state the levels as follows:

1. *Instinctive behavior*, modified by the natural consequences of the act. The child soon learns not to strike his hand against hot or sharp objects. Similarly, his diverse activities lead him to suit his responses to many inanimate and animate objects.

2. *Reward and punishment.* At the second level conduct is governed largely by external control manifesting itself in a scheme of rewards and punishments administered by parents and others. Much of the conduct of childhood is upon this level.

3. *Social approval and disapproval*, conduct influenced by force of the opinion or sanctions of the group to which the individual belongs. This level of conduct is supposed to be especially characteristic of the gang ages.

4. *Altruism.* The impelling force is an ideal which leads the individual to do what he thinks is right even though his

fellows may disapprove of it. The sanction is his realization that a certain conduct response serves the welfare of the group, or is the right thing to do.

The level of instinctive behavior molded by natural consequences is early attained and many features of environment are responded to upon this level throughout life; that is, the early responses are quite adequate, are repeated over and over many times, and become so habitual that little or no conscious direction is involved. Since they are adequate no essential changes are made in them and they persist throughout life. Under the best developmental conditions the level of reward and punishment is largely outgrown as the child grows older, and his responses are mostly upon the third and fourth levels.

Force of group opinion. Public opinion is a powerful means of contolling many phases of the individual's conduct. By conforming to the ideals, beliefs, and customs of the group he identifies himself with it and becomes a member. He feels some sort of kinship with the other members. He comes to regard much of his own individual welfare as identical with the common good. When the group is engaged in some engrossing or vital activity, he is likely to submerge himself and his personal desires to the more obvious desires and purposes of the group, as in time of war or in some hotly contested interschool or interclass athletic game. For the time being, the identification of the individual with the group may be almost complete. Social welfare is seen and felt as embracing individual welfare. Having identified himself with others through thought, feeling, and overt action, he is likely to be influenced greatly by social praise or blame in its various manifestations.

The group is not, however, something unique, separate, and apart from the individuals who compose it, any more than it is merely the sum of all its members. Each receives

and each contributes. Group action and opinion are molded by the constituent members. The individual often finds his greatest self-expression and satisfaction in shaping group activities and opinion. Leaders emerge who direct and modify group reactions, not by autocratic external compulsion alone, but by securing the coöperation of others. In an ideal society every individual would be a leader of some group, however small, in respect to something, however narrow and limited it might be. It may be that the superior blessedness of giving over receiving is due to the fact that only by giving may the individual really receive. Apparently, this is the case in character development.

Group approval and disapproval not to crush individual initiative. A limitation upon social praise or blame as a level of conduct is that it alone does not make ample provision for that individual initiative and freedom of thought and action which are necessary for the fullest development of individuals and for the progress of the group. The individual may disagree with the accepted standards and customs. In a democratic society he should have the right to freedom of choice, as long as he does not interfere with others exercising the same right. His non-conformity may be for the best interest of all. Enough tolerance of non-conformity is needed that he may try to bring his associates to his way of thinking; although, in the final analysis, he will be held responsible for his action in any vital matter. In this way provision is made for healthy interaction between the individual and society in respect to ideals, beliefs, and other standards of action.

Altruism as a level of conduct. Since the narrow, rigid conformity, which in the past prescribed individual conduct even in the smallest details, has given place to wide latitude for individual freedom, initiative, and diversity of conduct, social welfare will best be served if conduct within this zone

of individual freedom and initiative is upon the level of altruism — is evaluated by the criterion of the highest common good.[1] If the individual feels the force of this kind of control, he is not so likely to act selfishly or in other antisocial ways. Individuals may even oppose the accepted beliefs and customs; but, within certain limits which space forbids our discussing here, this is a good condition when these individuals are truly convinced that the highest common good is thereby promoted.[2] A certain independence and self-reliant initiative are desirable. Independence of thought and action, the ability to break away from the accepted and customary, is seen in the history of human progress — in science, invention, statecraft, industry, morals, and religion.

Adolescent conduct upon each level. Part of the adolescent's conduct is upon the first level, or upon a plane closely resembling it, and remains upon it. Many things relating to physical welfare are early responded to in this way, and the child becomes habituated in accepting certain consequences as inherent. As he develops and has more experiences and greater insight into his surroundings, he may see that certain consequences, heretofore regarded as inevitable, really are not, but may be avoided. If he does see such possibilities, his conduct toward this kind of situation may change from the first level. Growth and experience merely correct an earlier misunderstanding. Many of the reactions upon this level concern such simple elementary situations that the early appraisals are useful and approximately correct. Accordingly, early habituations become firmly fixed and continue.

[1] For extended discussion of the individual in relation to the group see texts on Social Psychology, Sociology, Ethics, and Philosophy of Education.

[2] Stupid, selfish opposition and rejection of group standards are, of course, not referred to above, nor are the evils and dangers of ignorance overcome by mere good intent.

Reward and punishment still have a rôle to play at puberty because the youth's impulses and desires are not all coördinated and fitted into a stable character. Social approval and disapproval have much force at puberty, being a form of reward and punishment; public opinion is a powerful instrument of control, particularly the opinion of those his own age and a little older with whom the youth is closely associated in a wide variety of engrossing group activities. Anticipation of social praise and blame begins its career of influencing individual behavior long before pubescence and doubtless lasts well on into senescence; but its force is probably somewhat greater during adolescence than before. With many individuals it continues to be a dominant determiner of conduct long after the close of adolescence. There is evidence that it exerts a greater influence at sixteen or eighteen than during the earlier teens. Under suitable circumstances the force of unselfish conduct increases greatly during adolescence. Knowing himself and his world better than ever before, he is finding his own place in it. Both intellect and emotion are impelling him to reorganizations and it is now possible for altruism to become the basis of significant phases of conduct, if the training (past and present) is appropriate.

Adolescent behavior to be controlled largely by group opinion and altruism. School and home may well seek to place control as much as possible upon the third and fourth levels. Successful teachers and wise parents employ a wide variety of appeals so as to stimulate the best impulses. Wide, intimate knowledge of adolescent personality, together with a constant realization of the uncoördinated condition of many of the youth's impulses, and straightforward, frank, honest, sympathetic treatment are essential. Sometimes, even in very tense situations, parent or teacher may possess enough self-control and be quick-witted enough

to arouse a good impulse in place of an undesirable one, as shown by the following incident in a girls' high school:

A teacher was assigned, during the school year, to a class of girls having the reputation of being exceedingly difficult to control. As she came to the classroom to meet them the first time, they were very noisy. Entering the room in the midst of the hubbub, she rapped for order, told the girls pleasantly enough that they were so noisy that they could be heard to the end of the corridor, and went ahead with the lesson as if nothing had happened. The next day when she met them, they were so hushed and quiet that she knew some sort of outburst was imminent. Looking over the entire group quickly but unhurriedly, and having the attention of every girl, she said, frankly and pleasantly, "You're a good bunch; I knew you could do it." The girls responded to her good nature and praise as one would expect.

5. *Factors in the moral development of adolescents*

A long list of specific factors affecting the adolescent's moral development could be enumerated, because it is quite evident that every idea, every person, every action, every event with which he comes in contact has possibilities of furthering or retarding his moral progress; but space and other considerations permit only a few observations on two general classes into which the specific items may be divided.

Pre-adolescent training and instruction. What the boy or girl is at the beginning of adolescence plays an important rôle in determining what he will be at its close. Successful, wise treatment before the teens is the *sine qua non* for best results thereafter. Earlier misunderstandings, bad habits, and other forms of maladjustments lead to unnecessary difficulties during the teens. If pupils entering high school and youths entering industry have formed desirable habits under circumstances and conditions that render the habitual

responses satisfying, and if they have acquired some useful knowledge and some serviceable ideals in useful ways, then they are well started on the formation of desirable moral character. Clinical and other evidence indicates unmistakably that most of the problem cases have become such through unsuitable home and school conditions, and that these two agencies, rather than the child himself, are to blame for his shortcomings. Often no attention is given to the child's moral development until some bad habit or other undesirable tendency makes its appearance, positive moral training being almost completely lacking.

To adults falls the task of directing the development of the immature — a task which can be neither profitably shirked nor easily performed. To blame the child for the natural results of our unwise handling, bungling ignorance, or selfish neglect is both stupid and inane. Somewhere and somehow society must find wisdom and force and patient, unselfish persistence sufficient to give each child the unique treatment which his nature demands.

Adolescent training and instruction. The principles underlying the direction and control of adolescent behavior will be discussed in Chapter XVIII. We, therefore, confine our present discussion to certain aids and obstacles to youth's moral development.

One of the most serious handicaps to the moral training of boys and girls in the teens is the questionable and undesirable conduct of adults who nevertheless are respected members of the community. In his enthusiastic idealism the adolescent is likely to detest sham, double-dealing, hypocrisy, and other similar conduct. To be specific: It is generally agreed that much valuable moral training may be secured from competitive athletics on account of the youth's learning to play the game fairly, to be good sportsmen, and to subordinate selfish interests for the good of the group.

Now, it is possible for these desirable results to be secured from properly administered athletics. Yet physical education teachers and athletic coaches often have great difficulty in making the athletic program serve these useful purposes. The community often insists so strongly upon having a winning team that the athletic program cannot be extended to reach all students who might advantageously engage in it; it is limited to the few very good athletes. Even more serious are the all too numerous cases in which leading citizens of a community insist that good athletes who are clearly ineligible be kept eligible by the teachers; that is, that their patent ineligibility be overlooked. Overwhelming pressure is often used to keep the school from playing the game fairly and according to the agreed-upon rules. Sometimes the school is unable to meet this situation alone and is forced to seek the aid of the State High-School Athletic Association. The spirit of good sportsmanship is often lacking, and pupils know that the "rules of the game" do not apply to good athletes. The situation in college athletics is probably as bad or even worse. Here the trouble is often due to alumni working independently or through the graduate manager of athletics. The vicious thing about such conditions is that winning is set up as the supreme goal, and emphasis is placed upon the vicious principle that "anything is all right, if you can get by with it."

If space permitted, other lines of evidence could be presented showing that the effective moral training of adolescents is seriously hampered by the undesirable, unsocial conduct of adults (both parents and others) whose conduct they naturally regard as a standard; for example, by their sharp business practices, the non-observance of laws and other rules of the game, or the employment of technicalities to secure immunity from justly deserved punishment.

On the other hand, the youth's moral progress is furthered

by wholesome, engrossing activities, by useful habits and knowledge, by high ideals of unselfish service, and by the exemplary conduct of those adults to whom he looks for guidance and for standards.

The "revolt of youth." Many people are disturbed by the age-old, ever-recurring revolt of youth, seeing in it symptoms of a serious breakdown of the moral code. While certain features of the revolt are disturbing, especially those that may result in substituting sophistication for self-control and discipline, yet other features are decidedly wholesome. We do not refer to the frankness of modern youth as a noble virtue, as some have done, because, merely "being free in uttering one's real sentiments," while desirable, is a very small part of moral character. We place greater emphasis upon youth's break with the compromise and broken "rules of the game" of adults. It is part of their critical questioning attitude, and is a challenge to many features of our material civilization which disregards agreed-upon rules, uses power selfishly, and thwarts the spiritual development of our people. Such features of the revolt of youth are wholesome, for the simple reason that many phases of our civilization may well be challenged; but youth need also to develop that self-control and discipline which fit them for the strenuous task of remaking and improving the existing social order.

6. *Origin and development of the individual's religious beliefs*

Religious beliefs acquired, not innate. The child's first religious beliefs are acquired. They are not inborn. He learns them from others. In fact, his earliest ideas, beliefs, etc., along all lines, religion included, come from his experiences and from what he is told. The young child is a believer; at first he believes everything he is told. As some one has said, at this early age "the world of assertion and

the world of truth have not yet parted company." His ideas of God, heaven, Jesus, Holy Ghost, and various other religious concepts are derived from others. He believes what parent, teacher, minister, or priest tells him. His notions are crude replicas of their statements, modified to be sure, somewhat in accordance with his state of language development. He uncritically accepts all teachings because he has not the experiential and developmental backgrounds necessary for their critical evaluation. His earliest religious beliefs rest upon unquestioned authority.

The nature of early beliefs. The exact nature of his earliest religious notions depends for the most part upon the kind of instruction he has had. Many of them are more or less verbal and stereotyped because they have been presented in a formal, catechismal manner and are clearly beyond his understanding. Often he may not know the meaning of the majority of the words in the sentences and phrases employed in giving him instruction — surely an indefensible procedure and contrary to all sound pedagogy. Under more favorable instructional conditions he is taught things which are within his range of understanding, and is taught them in a clear, simple, concrete way so that his beliefs may have some functional value in worship, as well as in building up habits and ideals of conduct, although they are not likely to make a strong personal appeal in regulating conduct before adolescence. Considerable progress has been made in recent years in improving both the content and the methods of religious instruction of young children.

Development during childhood. During the years before puberty the religious aspects of the child's life are modified in many ways. New religious teachings and new ideas are a factor, of course, but even more significant are his growing mental powers and his expanded and organized mass of experiences. As a result of his wealth of experiences he is ac-

quiring standards of judging, evaluating, and integrating his knowledge. From his increased mental ability he has greater capacity for judgment and organization. Accordingly, his old ideas and new teachings along all lines are likely to be more critically appraised. His religious beliefs share in this critical examination.[1] If his beliefs, received upon authority, conflict in any way with his experience, and if he notices the conflict, the usual result is that authority loses some of its power over him.

It is very unfortunate for the child's religious development for his teachings to be formal, dogmatic, and largely doctrinal. The seeds of religious doubt are thus early sown in his mind. He cannot discard his experiences, for they are the foundation of the meaning of things. Nor can he well believe things that do not square up with his experiences. The alternative to dogmatic verbalism is not the omission of all religious instruction until he is "old enough to understand it fully," as some parents believe, but rather the inculcation of notions suited to the child's needs and stage of development. The same criteria as to content, gradation, and presentation apply here as in all other problems of child training and education. That doubts arise from conflict between what children are taught about God and their own developing ideas of justice and goodness is illustrated by the report of a child of ten who said, "God must have known that Adam and Eve would eat that apple, and they couldn't help doing it anyway if He planned to have them do it. So why did He blame them?"

During childhood the most important changes relate to the child's religious ideas and to the elements of worship which make the strongest appeal. There may be some slight change in the amount of personal appeal made by his

[1] Unless, of course, he has been thoroughly trained to unquestioned acceptance of what is told him by parent, minister, or priest.

religious notions. We are inclined to believe that greater emphasis is needed upon the appropriate elements of worship and not merely upon the acquisition of more facts and more information, lest religious instruction become coldly intellectual and lose the great value which, through worship, it may have for the growing child.

Development during adolescence. Under good conditions adolescent religious development continues along lines similar to those of the pre-adolescent years, but there are certain significant differences. Religion now makes a definite personal appeal. This is not at all surprising, because it is happening with his other experiences as well. All of them tend to have greater direct personal reference; he has a deeper realization of their meaning. This is partly due to the fact that with sexual maturing come greater independence and self-assertion and a fuller consciousness of his selfhood. Anyhow, the youth has a deeper personal realization of the meaning and content of religion, and sees it more clearly as his own. This personal or subjective view of religion is characteristic of the teens. Kupky,[1] from his study of the diaries of adolescents, has also shown this fact.

Adolescent doubt. Many adolescents, especially those whose early religious training has been dogmatic and doctrinal, have periods of religious doubt. The youth often rebels against authority. His enhanced independence and self-assertion, coupled with his greater reasoning power and his increased fund of experience, lead him to question many things which he previously accepted uncritically. We do not mean to imply, however, that his critical sense suddenly comes forth, Minerva-like, because it really has a long developmental history. Many a child at five or six shows this function developed considerably beyond the zero point. At adolescence several traits combine seemingly to accentuate

[1] *The Religious Development of Adolescents.*

the strength of some of them. The youth is re-evaluating his entire world, and it would be strange indeed if he raised no question about any of his religious beliefs. In his progress toward mental and moral independence it is almost inevitable that he should question his beliefs. Sometimes the youth's intellectual doubts are the source of much discomfort. According to Coe:[1]

> Now is the time when real statesmanship in education is needed — the statesmanship that believes in freedom of thought; that believes in the capacity of young persons of serious mind to attain a personal conviction on all points that are essential to their character; that conceals nothing, and resorts to no indirection or subterfuge; that has sympathy, good humor, patience; that refuses to permit any young person to excommunicate himself in act or in feeling because of his doubts; that has a strong grip upon the fundamental verities, especially the practical faiths upon which our real life depends; finally, that engages young persons in active service of humanity even in the midst of the severest doubts.

Persistent, open-minded, serious search for the truth has carried many older high-school pupils and many college students through such periods of doubt and has enabled them to find a satisfying religious experience. Through deeper, broader experiences many youths have come to differentiate the realms of faith and those of science, and to see that different methods are appropriate to each; and thus they avoid (as so many scientists, ministers, and others have done) a needless, wasteful conflict between science and their own personal religion.

7. *The place of religion in the life of the adolescent*

Under favorable conditions, religion occupies a very important place in the life of the maturing boy or girl. It satisfies his groping for a fundamental, synthesized understanding of the whole realm of experience. It gives him a

[1] Coe, G. A., *Education in Religion and Morals*, p. 264.

sense of values, a sense of personal relationships and obligations. It facilitates the formation of high ideals of unselfish service. It gives him help in attaining that self-control and self-discipline which characterize strong personality. It reënforces his moral character. It aids him in resolving many conflicts of impulses and desires, and thus assists him in attaining sound mental health. Praise, prayer, and other elements of worship may enrich and deepen his life, and add much to its wholesomeness and happiness. Religion in reality involves personal devotion to a Supreme Being, and can provide a unifying force for all that is highest and best in the youth's nature.

PROBLEMS FOR DISCUSSION

1. Positive *vs.* negative moral training. Direct *vs.* indirect moral training.
2. What moral instruction may be given through the study of literature and biography? Just how valuable is it?
3. The value and use of the honor system in the junior high school; in the senior high school.
4. What can the high school do toward developing respect for property and respect for rights of others?
5. Place of student government in the junior high school; in the senior high school. What are the chief dangers to be avoided?
6. How can the school help to develop an appreciation of our social institutions that will lead to practical results and not mere sentimentality?
7. The advisability of introducing courses in morals into the junior high school.
8. What are the essential differences between the moral instruction of boys aged twelve and of boys eighteen years of age?
9. Means of developing an ethical consciousness among adolescents.
10. The development of fair play.
11. Show how the inadequacies of instinct and impulse necessitate a moral code. Under what circumstances would a moral code be unnecessary?
12. Discuss the following question by a conscientious high-school

teacher: "What stand should a teacher take when she knows she is expected to 'pass' a boy who is obviously failing, but is a star athlete upon whom a great deal depends, and she knows, too, that the other pupils realize the situation?"

13. Will the social sciences help the adolescent to adjust himself to his environment? If so, what material is suitable, and how should it be used to be beneficial to him?
14. How may the school encourage the formation of basic civic habits?
15. Discuss: Conduct is controlled primarily by feeling rather than by reason.
16. Prepare a check list of desirable moral social traits to be developed during the teens. What items would you include if you issued ratings on character traits on students' report cards?
17. Evaluate each high-school subject in relation to its actual and possible contribution to moral education.
18. Advantages and disadvantages of placing a "problem" boy in a group morally his superior.
19. To graduate from a certain public high school a boy must have military training, but instead he may elect the band. What treatment should be given to a boy who, because of socialistic or communistic beliefs, refused to play "The Star Spangled Banner"?
20. The place of religious education in the life of the adolescent.
21. The place of religion in the moral training of the adolescent.
22. Science instruction in the secondary school and the religious life of the adolescent.
23. The attitude of adolescents toward religion. What factors determine it?
24. Whenever the Bible is taught in the secondary school shall emphasis be placed upon its literary, ethical, or religious values? Why? If upon the first two, would you regard it as religious education?

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CHAPTER XII

PERSONALITY: ITS MEANING, GENESIS, AND APPRAISAL

If the reader feels that our treatment of adolescence in the preceding chapters has stripped it of the romantic glamour with which popular fancy and the fiction writers have so often surrounded it; if he feels that we have given but a partial account — one that does not reveal the vital, pulsing, often confused and apparently chaotic but boundless activities of living beings; if he feels that the sum of the parts we have presented does not equal the real whole as he knows it from general observation, let him not be disturbed. We have attempted to keep close to objectively verifiable facts whenever they were available and have sought a critical, dispassionate presentation of the results of careful investigations, so that the essential known truth on the different aspects of adolescence may be thrown into clearer relief by being treated separately in serial order.

In the present chapter and the two which follow it we want to look at the adolescent as a going concern, as a living being, and to study his total organization of traits — his personality.

1. *The meaning of personality*

Personality has a wide diversity of meanings. While every one knows that the self or personality gives individuality to each person, and that, strictly speaking, every one has a personality, yet no one definite meaning is attached to the term. Three or four different ones underlie many of the uses of the term.

Personality as an unanalyzable nucleus or core. Personality has been regarded by some as a final nucleus or core, as an inner essence of the individual which resists analysis; as spirit, self-consciousness, the unconscious, a bit of soul-substance which exists independent of the stream of consciousness — of the thoughts, feelings, emotions, and other conscious (and unconscious) activities — but is the force or entity which integrates them. Little need now be said of this conception, because few accept it at the present time and valid objections, beginning with Hume and his *Treatise on Human Nature*, have been marshalled against it. Postulating an unanalyzable central core is unsatisfactory. Much knowledge and experience are necessary to be sure that a thing cannot be done, or that an analysis cannot be made. In the present case too little is known about personality, and the possibilities of extending our knowledge of it are too great for us to set up a definition which assumes an intellectual impasse.

Personality as the stream of ideas, feelings, and emotions. The term is also used to connote merely the stream of ideas, feelings, and emotions — a use for which inadequate justification is found, as revealed by the discussions of the radical empiricists and their critics. It fails to account for that sequential continuity or organization of experience about a central system (or systems) of purposes whose existence and fundamental importance are attested to by observation and reflection.

Personality as the "principle of unity and synthesis." A third view, well expressed by Tracy,[1] considers the self or "ego" as "the principle of unity, synthesis, and constructive interpretation, by which the phenomena become intelligible and the mental world presents itself as a cosmos instead of a chaos." By this is meant that the significance

[1] *Psychology of Adolescence*, pp. 121–22.

of the phenomena of experience is given by this binding principle — the self or ego. The self exists in time, and its experiences are organized in a time-sequence and possess continuity. This view has much to commend it and is in many respects similar to the following one which, however, is more definite, more explicit, and, we believe, more easily comprehended.

Personality as integrated instinctive-, emotional-, and habit-reaction systems. Personality, according to a fourth definition, is the individual's peculiar integration of instinctive-, emotional-, and habit-reaction systems, together with his merely physical differentiating characteristics. According to this view, personality is not a mysterious, intangible, unknowable entity, nor is it merely those characteristics which have some obviously social import, as is popularly believed; but rather is it the individual's entire organized systems of response, his habits, his ideals, his attitudes and purposes, his impulses — in fact, all his traits, both useful and useless, as well as those which actually interfere with his adjusting himself adequately to life's situations. We cannot doubt that habit-systems form a large portion of the adolescent's personality.[1]

Normal personality. According to Rosanoff,[2] desirable personalities show a fortunate combination of traits. In normal personality are found a power of inhibition, a rational balance (which perhaps is best displayed in following a guiding line or principle of conduct throughout life), emotional control or stability (consisting in the ability to maintain uniformity and continuity of feeling), and superior durability.

While personality includes the whole range of a person's traits, habits, attitudes and ideals, and abilities of various

[1] Cf. Watson, *Psychology from the Standpoint of a Behaviorist*, pp. 417 ff.

[2] "A Theory of Personality Based Mainly on Psychiatric Experience"; in *Psychological Bulletin*, vol. 17, pp. 281–99.

sorts, yet we give more attention in this chapter and the two which follow it to those traits which have not been discussed in the preceding chapters.

2. *Genesis and development of personality*

The beginning of the child's personality. Personality has its origin in the child's native equipment, and develops through its modification by people and things. Under the stimulus of his surroundings the infant exhibits his childish repertoire of innate behavior patterns; influenced by the satisfaction and annoyance attendant upon his responses, he modifies them in varying degrees, inhibiting some, changing others greatly, and fixing others with very little alteration — thus building up his own peculiar organization of traits. In Chapter XI we saw how praise and blame, as well as reward and punishment, affect him. His organization of modified instincts, emotions, and habits is largely dependent upon his social experience. Very early he notes signs of approval and disapproval and uses this knowledge to adapt himself to his surroundings. He learns, for example, how to get along with people, bending them to his will by whatever devices he has found effective — crying, bullying, teasing, or pouting, if he has been spoiled by his training; or by smiling and other more widely socially approved means, if he has had suitable training — or yielding to their demands when he cannot avoid doing so. Of course, he differs from others in personality because his native equipment, his fundamental stock of developmental possibilities, is not the same as theirs; but he differs from them also by reason of the social environment which, through reward and punishment, praise and blame, modifies his responses and gives him a basis for selecting those which remain and become relatively permanent elements of his reaction systems.

Personality not merely the idea of "self." The person's idea of "self" at any time during his development is, of course, a part of his personality, and undoubtedly exerts an influence upon its further development, since self-consciousness plays a rôle in setting up and unifying ideals and purposes and in selecting the means to be used for their attainment. Personality, though, comprises a wide range of systems of response, as we have already seen, and is not merely the consciousness of "self." Even if one's idea of "self" is very precise and quite correct, it is not his personality. Many other concepts are included, as well as a vast number of tendencies, impulses, habits, and other forms of response.

The rôle of environment and purpose in the development of personality. The growing child is beset on every hand by a vast number of situations to which he must respond. They assail him with varying degrees of force and frequency. In time he builds up certain modes of response, which may be evoked by certain prepotent elements of his environment. Thus he develops a many-sided personality, whose diverse aspects are revealed from day to day as he meets a wide variety of situations. In a given situation one set of traits is displayed; change the scene and a different set appears. At home with his small children, at church, at the club, at a political meeting, in conference with business or professional associates, a man reveals a diversity of traits. The normal boy at fourteen or sixteen has a similar manifold personality. At home with an austere father or an indulgent mother he is not quite the same boy as when he is with his gang, or is at school engrossed in some cherished activity. Different situations call out different responses, largely because different responses have been built up through contact with those situations or other similar ones.

A narrow one-sided personality often develops from narrow experience or the warping effect of some highly pre-

potent circumstance; or the individual may attach too great significance to some group of experiences. Ideals and life-purposes also affect his development. In accordance with them he shapes his conduct, molds his character, and builds up specific types of response. If his chief purpose is financial success at any price, he may become grasping, drive hard bargains, and be ethically dishonest. If, however, financial or business success is one of several important considerations in his life-purposes, a different personality tends to emerge as time goes on. The person who is ambitious for a social career may give much attention to attaining the ready wit, the light gayety, the facile smartness, and the poise deemed characteristic of the "social lion." If he possesses a consuming desire for profound scholarship, he may narrow his interests, limit and intensify his activities, and eventually develop a narrow personality. A danger of specialization is its narrowing effect upon the individual. Dean Woodbridge, noting the high degree of specialization within the graduate schools of our universities, has said:[1]

> It would measure up to the heart's desire if our graduate students who go forth to be leaders in educating the youth of the land and in extending the boundaries of human knowledge, were specialists to whom poetry was not strange or science unintelligible.

The broad personality, which includes a wide variety of wholesome significant interests, activities, and appreciations, is not necessarily superficial or chaotic. Strength of character and breadth of view may and do exist side by side in the same individual. Narrowness is not a prerequisite to depth, nor does breadth preclude that orderly coördination of all one's powers and capacities by which they are given their due rank and proportion.

As a general rule, the antidote for the undesirable results

[1] *Report of the Dean of the Graduate Faculties of Columbia University*, 1927.

of narrow experience is provision for broader ones; here too, an ounce of prevention being worth a pound of cure. Nor must we forget that the child's ideals and life-purposes are greatly affected and largely determined by the social groups to which he belongs.

Undesirable developmental trends to be prevented. Children are developing before and during adolescence. Accordingly, care needs be taken to avoid undesirable trends of personality, which may be formed without parents, teachers, or the child himself being aware of their beginnings. These trends, at first almost imperceptible in their slight deviation from the customary, may become serious personality handicaps, as the following case shows:

J. B.[1] was a timid, highly suggestible little fellow, fearful of disease, who thought he had every ailment of which he heard. At eleven he was repeating the third grade, was pale, thin, and angular; showed during examination facial twitchings and jerkings of the head; twisted his fingers and clothing, and bit his nails. In school he was slow, always asking to go to the dispensary for some trouble the doctors could not find. For "two years he had come home from school with 'nervous crying spells,' complaining of headache, dizziness, nausea, and shifting pains in the abdomen." According to the Binet-Simon tests, he was normal. Medical examination showed no cardio-vascular disturbance. He lived with a maternal grandmother across the street from his home because of crowded home conditions and because of his shiftless, alcoholic father's antagonism to him. He retired at any time from 10 to 12 P.M. Coffee and fried potatoes were the only things he would

[1] This case is reported by Dr. E. L. Richards, of the Phipps Psychiatric Clinic of Johns Hopkins University, who made the examinations and directed the modifications leading to suitable adjustment. See *Mental Hygiene*, vol. 4, pp. 331–63.

eat. He displayed a lively interest in his complaints. Dr. Richards's account of the interview follows.

1. *Headaches:* "I got 'em when I was in the first grade. They are like my mother's and get worse when I'm worked up over something. When I think of people dying, I get nervouslike and cry. I think my nose is going to close up." He had heard it said that adenoids should be cut out or they grow and "shut off your breath." His nose and throat examination has been persistently negative.

2. *Pains in the stomach:* This symptom developed about two years ago, when he complained of pains in his right and left abdomen. Questioning brought out the fact that the distress was coincident with hearing his mother talk about a girl who had a "cancer cut out of her stomach because she wore her clothes too tight." The patient worried for fear he would die from something like that. He discarded his belt and hitched his trousers on with a safety pin.

3. *Pains around the heart:* "I get pains around my heart, and sometimes I feel to see if it is going. Grandmother tells me to rub it like she does when she gets 'em, and makes me go to bed with hot ginger tea. Mother has 'em, too. I can't run no more. I get out of wind. I used to run on the Public Athletic League track, but I gave it up on account of my heart."

The boy and his mother coöperated in carrying out Dr. Richards's suggestions for modification. A year and a half later he seemed a different boy. Color was good, flesh was firm, and he had gained in weight. He appeared bright and alert, and school work was much improved. His complaints seemed to have disappeared. He was active in gymnasium, basketball, track, and swimming.

Incipient personality disturbances commonly neglected. Apropos of the common neglect of incipient personality disturbances, Dr. Richards refers to two such cases, asking with pointed sarcasm,[1]

Had their teeth or tonsils or eyes or ears or lungs been weighed in the balance of medical examination and found wanting, would these children have been allowed to continue without reconstructive

[1] See *Mental Hygiene*, vol. 4, p. 340.

attention on the theory that they would outgrow such unhealthy biological markings? And yet many a "Neurasthenic" invalid, crowding the benches of our dispensaries or draped over our rest-cure homes, could tell a childhood story of traits in common with J. B.

During childhood and adolescence some experience, thought, feeling, impulse, or other activity may become a source of trouble. The youth may worry over it, brood over it, until it takes on an emotional value or significance out of all proportion to its real importance. The youth needs and is entitled to receive from his adult world, especially from parents and teachers, that sympathetic understanding and cordial comradeship necessary to establish a bond of trust and confidence between them. Then only can the adult be effective in leading him to face facts candidly, appraise them critically, strip them of their unwholesome emotional import, and thus secure poise and balance through giving them their proper place in his total life activities.

A wholesome childhood essential to effective adolescent personality. A broad, well-balanced, effective, adolescent personality presupposes a happy, wholesome childhood filled with real, vital, engrossing activities, many of them group activities, through which the youth becomes habituated in meeting adequately a wide variety of life situations. In the same manner, adolescent personality becomes accustomed and adapted to wider and more complex surroundings, reaction systems become more firmly fixed, and the youth attains manhood or womanhood.

3. *Methods of appraising personality*

Many diverse means of estimating personality traits now in use. Self-styled and self-advertised "experts" give personality ratings and analyses, as well as estimates of vocational aptitude, to many "inquiring" persons. Not only

are the majority of such "experts" sadly deficient in the broad fundamental training and in the basic technical preparation necessary for efficient work along these lines, but the methods they employ are known from careful investigation to be almost or entirely worthless. The advice, information, appraisal, or prophecy may be pleasing to the person seeking it, but, apart from its possibly giving the inquirer such satisfaction, the estimates are of little value. Others, better trained or more competent, are using various methods more critically and cautiously and are finding some of them of value within specified limits of error. We do not have space to examine all of the methods in use, so we limit our discussion to those more commonly used and indicate some of the more accessible valuable literature on the subject. Serious difficulties are encountered in trying to make accurate appraisals of human personality, but perhaps we can understand them best after we have discussed various means which have been proposed for their measurement.

1. *Estimating personality from differences in head and skull formation — phrenology.* In times past phrenology has had a wide vogue and often, in the hands of its practitioners, gave agreeable optimistic forecasts of the ability and future achievements of those rated. Proud parents were often told that they should not be surprised if their son became president or attained eminence in some other way; but the method is worthless as an instrument for accurately appraising the present or reliably forecasting the future. Brain configurations do not conform to the outer contour of the skull; but, even if they did — if they were absolutely identical — capacity and achievement could not be foretold from the shape of the skull because the localization of brain functions is not highly specific. Phrenology has no scientific basis whatever; all that is known on the subject indicates its inadequacy and worthlessness.

2. *Differences in texture of skin, eye color, hair color, shape of nose and hands, and other biological characteristics.* Numerous character-reading systems are based upon the assumed validity of interpretations given to various biologic markings of the individual. We have canvassed the literature on this subject at some length, but have found no scientific evidence supporting the extravagant claims of the many systems which purport to read off a man's personality traits from a knowledge of the color of his hair and eyes, the texture of his skin, the shape and size of his nose, mouth, hands, or fingers, or from other similar features. Even such classic indicators of character as the square chin, firm mouth, or intellectual brow cannot be relied upon for accurate results. Such extremes of personality as the cretin or idiot can, of course, be recognized from a photograph, or a very brief glimpse of the individual; but no accurate selection even of the various grades of mental defectives is possible by any such means.

3. *Estimating personality traits from photographs.* Judging human personality from photographs still enjoys considerable popularity, and is widely used as a means of selecting candidates for positions, although the evidence at hand from investigations of its reliability and validity gives no grounds for placing much reliance upon many of the trait-ratings secured through its use. Judging intelligence from photographs, apart from the extreme types referred to in the preceding paragraph, does not seem to be of much value. The ratings are almost as erroneous as guessing, being from only one to five per cent more accurate than chance ratings. If the ratings by twenty-five or more judges are combined, the results may be as much as fourteen per cent better than guessing. Judgments of neatness, sociability, humor, likeability, and conceit seem to be even less reliable than those of intelligence. Beauty and vulgarity, according to one

study,[1] were estimated a little more accurately than intelligence, but even with the more refined techniques, twenty-five to fifty judges are needed to secure combined ratings twenty to twenty-five per cent more accurate than guessing.[2]

4. *Judging personality from handwriting.* Extravagant claims have been made to the effect that differences in handwriting are reliable guides to personality traits. A bulky literature on the subject has developed. The methods of investigation used in recent years are better than those employed in earlier studies. Miss Downey found "that it is possible to determine sex from handwriting in perhaps eighty cases out of one hundred." Hull and Montgomery, at the University of Wisconsin, made a careful check of the correlation between certain characteristics of handwriting and the personality traits of which they are alleged to be symptomatic. We cannot go into details further than this — their experiment revealed no correlation between upward-sloping lines and either ambition or pride; between fineness of lines and bashfulness; between force and the heaviness of the bars on the *t*'s; between perseverance and the length of the bars on the *t*'s; or between reserve and the closing of the *a*'s and *o*'s. Both the method and the results of this careful study are in sharp contrast with earlier ones of a more or less popular nature; e.g., the one of Binet in which specimens of handwriting of eminent individuals were each paired with a specimen from a person similar in education and general social level but very mediocre in attainments. Graphologists who attempted to select from each pair of samples the one written by the more intelligent person made scores ranging from 61 to 92 per cent correct, and averaging

[1] Hollingworth, *Judging Human Character*, chap. 3.

[2] The criterion of intelligence, beauty, neatness, etc., in the investigation referred to above was the combination of ratings given on each of these traits by 25 acquaintances.

77 per cent correct choices. By chance 50 per cent correct choices would have been obtained.

We scarcely need to remark that selecting individuals from pairs whose members are widely divergent in some traits is a much easier matter than selecting them according to five or more gradations of the trait in question. Ranking on a two-step scale (e.g., better-worse) is easier than on a scale embracing five or more steps, but any errors are also greater.

5. *Judging personality from voice, gait, posture, etc.* Such brief, partial observations of the individual as noting his gait, posture, voice, gesture, etc., are unreliable bases for estimating his character, since such signs may vary with the circumstances under which they appear, and personality is too complex a thing to be indicated by such simple features. At adolescence these characteristics are even less reliable clues than afterward. At the best they are of only slight value for estimating a few traits. Apparently, an adequate appraisal of human personality must be based upon a broader, more intimate knowledge of the individual because his conduct varies so much under diverse conditions; i.e., diverse conditions call out reactions which otherwise might not appear.

6. *Judging personality traits from letters of application.*[1] Investigation shows that judgments of such traits as intelligence, neatness, reliability, and tact, from letters of application, are grossly inaccurate, being but little better than guessing or mere chance. A letter ranked first in neatness by one judge was ranked last by another judge. Another letter had ratings ranging from first to last, another from fourth to last. The ratings on reliability and tact were even worse than for neatness and intelligence, inaccurate as the

[1] For a good account of the experimental evaluation of this and other modern methods of rating personality, see Hollingworth, *op. cit.*

latter were. A judge's first rating does not agree closely with his second rating a month later. The combined judgments of several judges are some better than the ratings by one judge. A discussion of the means of improving the technique of estimating personality traits from letters of application lies beyond the scope of this volume.

7. *The personal interview as a means of estimating personality.* On *a priori* grounds we would expect the personal interview to be one of the best means of gauging personality traits. Undoubtedly the method can be used advantageously for certain purposes, if precautions are taken to prevent favorable or unfavorable general impressions from having too much weight in evaluating other specific traits, and if care is taken that suitable questions be employed. The method, however, as ordinarily used by employment bureaus is of little value, since the ratings are not much better than mere guesses.

We note the results of two investigations. Experienced sales managers of companies engaged in similar businesses interviewed applicants for positions as salesmen with their companies, each manager using any method of interview he chose. They ranked applicants 1, 2, 3, etc., on their suitability for the position. We might reasonably expect them to agree fairly well in their ratings on the group of applicants, since basing judgments of fitness for salesmanship upon interviews was a part of their regular activities; yet they did not agree at all closely. One applicant of a group of fifty-seven was ranked first by one judge, fifty-seventh by another, second by a third judge, and fifty-third by a fourth. One of the applicants whose ratings varied the least received ranks ranging from second to thirty-sixth. Two applicants had ratings ranging from sixth to fifty-fifth. The ratings obtained in the other study were in essential agreement with those just discussed. Although these ratings were unreli-

able on account of their wide variation, yet they are undoubtedly better than those of many employing agencies.

Combining the ratings of several judges tends to increase the accuracy of estimates, since, as Hollingworth[1] has pointed out, "the larger the number of interviewers, the more nearly does the final record approach to the impression the applicant is destined to make on the world at large," provided, of course, that many interviewers, through skillful questioning, evoke a wider range of significant responses. Having more judges tends to overcome errors of individual estimates. Of course, as methods of questioning are perfected, they begin to take on the qualities of testing methods which are discussed presently.

8. *Questionnaires as a means of ascertaining personality ratings.* Many questionnaires or trait lists have been developed, and are used to determine personality traits from the answers given by the individual or by his associates. According to the testimony of those who have used them, they are valuable for clinical purposes, but require much corroborative evidence, since self-ratings are highly unreliable and ratings by acquaintances are far from precise, as we shall see presently.

9. *Estimating personality traits by rating scales and by ranking.* Personality traits may be gauged by using a rating scale or by assigning ranks. A good rating scale lists several clearly defined traits in five to seven roughly described amounts or steps, as highest, high, average, low, and lowest. To rate an individual on a specified trait the rater assigns him to the position on the scale to which, in his judgment, he belongs. Individual A might thus be rated "high" in leadership, "average" in health, and "highest" in intelligence, etc. Ranking a group of individuals in a certain trait is merely arranging them in order and ranking them

[1] *Op. cit.*, p. 69.

first, second, etc., on that trait. If thirty high-school students were ranked on several traits, student A might rank "eighth" in leadership, "twelfth" in health, and "third" in intelligence. In rating, the individual's place on the scale is estimated by comparing him with the roughly defined steps or classes; but in ranking, individuals are compared directly with each other.

When judgments of large numbers are desired the ranking method becomes too tedious and tiresome, since making such fine discriminations is very difficult or probably impossible.

Man-to-man comparison — the Scott Rating Scale. The five steps on the Scott scale are to be selected by each rater himself in the following manner: first, he chooses the best person in the trait in question he ever knew and writes his name at the top of the scale; then he selects the poorest (in the trait) he ever knew and puts his name at the bottom of the scale; in similar manner and in order he chooses the "average," "better than average," and "poorer than average," giving numbers, 15, 12, 9, 6, and 3, to the five persons. Thus his scale for a trait is made up of five men whom he knows and regards as having these five amounts of it. In like manner he chooses five men for the five steps of his scale for each other trait. To use his scale the rater simply compares the individual to be rated with the men on the scale and places him nearest the "scale man" he most resembles in the trait in question, and gives him the corresponding numerical score. And similarly for each of the other traits.

On graphic rating scales the steps or classes are arranged from lowest to highest along a horizontal line. Ratings are assigned by placing a cross at any point on this line to indicate the person's standing in each trait.

Obstacles to accurate rating. Two fundamental difficulties are encountered in rating human personality.

First. Personality traits are not *absolute* qualities which

exist in fixed amounts, remaining constant throughout the entire range of circumstances under which the individual may live. One may be honest and deal fairly with his fellows on many but not all occasions; he may show marked leadership under certain conditions, but under other circumstances he may show much less of this quality. The degree of dependability, loyalty, perseverance, neatness, etc., manifested may and usually does depend upon the specific motivation, upon the total situation which, as we know, embraces elements both within and without the individual. Personality traits are not such fixed, generalized habits that they are equally constant and effective under all circumstances.

Second. Ratings are judgments, and at best are subjective. Even the composite criteria used to evaluate the ratings of many human traits are combinations of subjective estimates. Judgments of such intangible qualities as personality traits are ultimate. We cannot get back of them. We do not perceive honesty, perseverance, or leadership, directly; we are not conscious of them as objects present to sense. We infer their presence and form judgments of their strength upon the basis of acquaintance or observation of conduct.

Fortunately, the ratings usually needed are not appraisals of abstract qualities, such as dependability in general, leadership along all lines, or perseverance on all occasions; but rather estimates that indicate how dependable this person is for this particular sort of work, or how capable he is of initiative and leadership in this position, or how persevering he is likely to be in a given set of tasks.

The first obstacle may be partially removed by basing all ratings upon personal knowledge of specific responses revealing a given trait, rather than upon a hazy, general impression which so frequently includes very few pertinent observed responses. Listing and rating observed responses

and forming a composite from such separate specific ratings are likely to give better results.

The second obstacle may be removed by securing ratings by many competent and willing judges.

Validity and reliability of ratings. Both of the obstacles just discussed affect the validity and reliability of ratings, as do three other sources of error.

(1) We usually underestimate the ability of the gifted and overestimate that of the stupid, as Terman has shown. Persons above or below the average in some trait are likely to be rated too near the mean. The regression of judgments toward the mean is an indication of their unreliability. If we knew absolutely nothing about the amount of a trait possessed by each individual of a group, our best estimate (merely a guess) would be to place each one at the mean or average, the error of estimate then being the standard deviation of the group which is a minimum when computed from the mean.

(2) Often the ratings on particular traits are biased by a general impression of the total personality, or some one trait overshadows and influences the ratings of others — the "halo effect," discussed by Thorndike and others. This lowers the validity of ratings.

(3) Ratings by one's associates are likely to be more accurate than those by one's self. We are likely to overestimate the amounts we possess of desirable qualities and to underestimate the amounts of undesirable ones.

Some traits are rated more reliably than others. According to Hollingworth,[1] efficiency, originality, perseverance, quickness, judgment, clearness, energy, and will are rated with closer agreement than are mental balance, breadth, leadership, reasonableness, independence, refinement, physical health, and emotions; whereas courage, unselfishness, in-

[1] *Op. cit.*, p. 79.

tegrity, coöperativeness, cheerfulness, and kindliness are rated least accurately by a group of competent judges.

All investigations indicate that ratings by one judge are so unreliable as to be nearly worthless. Increasing the number of judges increases the reliability of ratings.

Rugg made a careful study of rating scales. He says,[1]

> Can human character be rated on point scales accurately enough for practical uses in education? Yes and No.
>
> Yes — if the rating given a person is the average of *three independent* ratings, each one made on a scale as objectified as the man-to-man comparison type.
>
> Second, if the scales on which the ratings are made are comparable and equivalent, having been made in conferences under the instruction of one skilled in rating scale work.
>
> Third, if the three raters are so thoroughly acquainted with the person rated that they are competent to rate.
>
> But these conditions are practically unattainable in public schools. Hence the answer to our original question — No, not by methods so far generally employed, and probably not unless methods of re-rating and checking judgments are carried far beyond present practical possibilities.

Symonds,[2] by applying the Spearman-Brown formula to obtained reliability coefficients, shows that a reliability adequate for individual diagnosis ($r = .90$) necessitates eight independent ratings by competent and willing judges. A reliability suitable for certain group purposes requires four independent ratings.

We might add, as a conclusion, that whenever we resort to ratings to secure information about adolescent personality traits, we can increase their reliability and validity in the following ways: (1) By defining precisely each trait, so that each rater knows its exact meaning; (2) by limiting the number of steps or classes on the scale to the gradations

[1] *Journal of Educational Psychology*, vol. 12, p. 425.

[2] *Measurement in Secondary Education*, p. 353.

which really can be differentiated, usually from five to seven; (3) by using enough judges to secure adequate accuracy, usually from four to eight; (4) by using competent and willing judges, those who know the adolescents well enough to be able to pass judgment on the amount of each trait possessed by each youth; (5) by training the judges to disregard all traits but the one upon which the rating is being given.

Measuring personality traits by tests. In previous chapters we have referred to or discussed tests of physical traits, intelligence, scholastic achievement, emotional tone, and interests. Accordingly, we limit our present account to tests designed to measure volition, moral discernment and conduct, and similar traits, without attempting exhaustive analysis, rigid classification, or extended treatment.

Psychologists have been attempting for some time to devise objective tests to measure such traits. The goal has been and is to secure as valid and reliable tests as those used to ascertain intellectual or educational status. Many of the attempts have resulted in failure, but on the whole partial success has been achieved.

Thorndike's fundamental axiom of all mental and social measurements that "whatever exists, exists in some amount," is obviously true; yet it is also equally obvious that certain inherent obstacles have thus far blocked the efforts of students of human nature to measure various personality traits adequately.

In addition to the obstacles discussed in the foregoing section on rating scales, we should note some others at this time. Three of the fundamental assumptions underlying the measurement of ability are: (1) that ability is ability to do; (2) that it is directly proportional to performance; and (3) that a specified ability can be evoked for its measurement. If, in any case, these assumptions are not true, the ability cannot be measured accurately. The second assump-

tion requires that those tested exert maximum effort. If some do not, then their performance is the result of ability and effort combined in unknown proportions. The student who knows much chemistry might not do as well as a really poorer student, if the former loafed and the latter put forth his best effort, and yet if we are to find out how much chemistry the two students know, both must do their best. With proper precautions the conditions under which an ability is tested usually can be so carefully controlled that this assumption is essentially valid, but, in measuring conduct and many other specific phases of personality, we dare not indicate what sort of responses are *really desirable*, nor may we urge students to do their best. Furthermore, provision has not yet been made for enough *bona fide*, truly significant situations to evoke responses for accurate quantitative appraisal.

However, some progress has been made, and two types of tests have been devised — those designed to measure verbal knowledge, judgment or discernment, and those to measure behavior. While much further investigation is needed before final evaluations of the two types can be made, yet the behavior tests seem to be more satisfactory than knowledge-judgment tests, because they place the persons tested in situations in which: (*a*) they perform an act, good or bad, and are scored accordingly, or (*b*) their performance of some act is observed to find evidence of "will-temperament," or other traits.

Behavior tests are hard to set up because situations must be provided which evoke behavior in which specified traits may be observed and scored. Tests of verbal knowledge or judgment are more easily devised and given, but, from Aristotle to the present time, men have known that knowledge alone does not insure moral conduct — that an individual's selecting the right principle or formulating the cor-

rect judgment may be largely an intellectual process whose accompanying impulses to action may be so weak that neither knowledge of right principle nor correct judgment is a guarantee that he will act in accordance with either. Of course, we may also be reasonably sure that moral principles will not be a guide to conduct if individuals do not recognize them.

Two of the most promising batteries of tests [1] are those by Raubenheimer, and by Hartshorne and May.

The Raubenheimer tests [2] of potential delinquency seek to measure overstatement, and to determine questionable reading and character preferences, social attitudes, activity preferences, and judgment of the seriousness of offenses. The Hartshorne and May [3] tests seek to measure moral knowledge through the application of eight tests covering cause-effect, duties, comprehensions, provocations, recognitions, principles, applications, and vocabulary, and to appraise deceitful conduct by using an elaborate series of performance tests.

4. *Types of personality*

Types of temperament. An almost universal tendency still exists whereby each individual is regarded as belonging to some one of the few distinct classes or types into which it is assumed that all human personalities may be divided. As early as the second century of the Christian era the Ro-

[1] See also references (3) at the end of this chapter, especially to Voelker, Cady, Downey, Fernald, and Thorndike (1916). Freeman in Chapter 8, *Mental Tests*, gives a critique of some of the tests, as does Symonds in Chapter 16 of *Measurement in Secondary Education*. Critical studies of the Downey "Will-Temperament" tests, such as those by May and by Reavis should be consulted.

[2] *An Experimental Study of the Behavior Traits of the Potentially Delinquent Boy.*

[3] *Studies in Deceit*, and articles in *Religious Education.*

man physician Galen postulated his well-known four types of temperament whose determiners, according to his views, were certain physiological conditions of the organism: (1) the sanguine who, having a surplus of blood and being warm-blooded, are animated and cheerful; (2) the choleric who, having a surplus of "yellow bile," are high-strung, quick-tempered, and irritable; (3) the melancholic who, possessed of an unusually large amount of "black bile," are sad and depressed; and (4) the phlegmatic who, having a surplus of phlegm, are sluggish, dull, and calm.

In recent times other attempts have been made to set up a few classes or types into which all individuals could be divided. According to these formulations, individuals are regarded as being men of thought, men of feeling, or men of action; as being of the positive or the negative type of personality, or of the rationalistic or the empirical type (William James's "tender-minded" and "tough-minded" people), or of some endocrine type; as being an extrovert or an introvert (Jung); or as belonging to some other type.

Inadequacy of classifications into types. The chief difficulty with all such classifications is that they do not apply to the great mass of human beings. Men generally do not belong to such extremes. We may, it is true, find men who are preëminently of a practical turn of mind to the almost complete exclusion of "thought" and "feeling"; we may likewise find others who are almost exclusively of the artistic temperament; and we may find those who are men of intellect to the exclusion of the other two sorts of traits; but, after selecting all the individuals who are clearly of these three "types," we shall have classified only a very small proportion of the human race. The vast majority do not belong to such extremes. Both heredity and environment tend to produce a large proportion of individuals who are at the average. Postulating "mixed" types does not help matters,

because it is merely an acknowledgment that our classification into "pure" types is largely academic, and does not apply to the great mass of human beings — really is not applicable to the data to be classified.

All that is known about individual differences indicates that individuals do not fall into the few discrete groups found in personality-type schemes of classification, but rather that the amounts of each trait are found varying amongst individuals by almost imperceptible gradations from very little to very much of it. Each individual's personality is unique; he is different from every other individual, however much he may resemble others in some specific traits. The conception of types of personality is useful in certain cases, especially in disturbances of personality and other extreme cases, but classification according to such extremes does not apply to the great majority of human beings, and does not, therefore, give us *types* which are *typical* of the great mass of individuals.

5. *Summary and conclusions*

Personality, apart from any intangible, metaphysical aspects, is the total organization of an individual's instinctive-, emotional-, and habit-reaction systems, together with his own mere physical differentiating characteristics. It is the integrated total of all his possibilities of response, and, of course, includes traits hindering suitable adaptation as well as those furthering it. Often the integration is loose and faulty, and many traits are present which lessen the individual's effectiveness, as we shall see in Chapter XV.

Heredity and environment are the two great forces from whose interaction personality emerges. The social forces which work upon the individual have great potency in giving form and direction to his development.

Some of the means proposed and used to appraise person-

ality traits are worthless, others are of value, although none of them yet possess validity and reliability adequate for precise measurement. Judging human personality traits from hair-color, eye-color, shape of hands, voice, posture, photographs, or handwriting seems to be of little value. Letters of application are found to reveal very few traits accurately. Even personal interviews are not as nearly infallible as one might suppose, since a final judgment so often is based upon a vague, general impression, rather than upon a composite of estimates of specific traits. Questionnaires have value for clinical purposes, but require corroborative evidence. Rating scales have value, if enough (four to eight) competent and willing judges use scales having five to seven gradations of clearly defined traits.

Devising valid, reliable, objective tests of many subtle traits is inherently so difficult that the movement, despite the vast amount of careful work already done, is hardly beyond the experimental stage; yet some progress has been made in measuring personality traits other than intelligence, scholastic achievement, emotion, and interests — especially in building up tests of moral knowledge and judgment, and in devising performance tests to measure certain features of behavior.

PROBLEMS FOR DISCUSSION

1. Differentiate individuality and personality.
2. The rôle of heredity and environment in the development of personality.
3. Effect of moral codes upon personality.
4. The effects of physical defects and peculiarities upon the personality of the adolescent. How may the school help prevent emotional conflicts from them?
5. Prepare a list of the best tests for measuring character traits.
6. What are the psychological traits underlying leadership?
7. What personality traits first appear at adolescence?

8. What are some of the more intangible elements of personality?
9. Discuss: At adolescence some newly found power of willing appears.
10. Discuss: Breadth of personality is very closely related to depth or significance.
11. Does the development of personality show a constancy similar to that found in mental growth? If any variation appears, what are the causes of it?
12. Describe in detail the case of a high-school student whose personality was marked by superficiality. What can the secondary school do for such students?
13. The significance of appreciation of beauty in nature and art in the development of the adolescent. What direction or guidance ought it to receive in the junior high school? in the senior high school? What can be done by other agencies?
14. The Hartshorne-May tests of the knowledge of right and wrong.
15. Behavior tests of character traits.
16. Tests of potential delinquency.
17. Limitations of present tests of personality traits.
18. What are five important problems of personality needing further investigation?

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CHAPTER XIII

ADOLESCENT PERSONALITY AND ITS PROBLEMS

1. *Qualities and traits of adolescent personality*

By the time of puberty the youth has gone far along the road to maturity — farther than we often realize. He is nearer maturity in some respects than in others. Many habits are well established and will be modified but little during the teens, whereas other traits are loosely fixed and may be greatly changed during these years. The changes in the various traits proceed at different rates, thus altering their relative strength in the total personality at the close of this period.

Physical traits. According to the data of Chapters II and III, the boy of thirteen is likely to have attained approximately seven eighths of adult height, less than two thirds of adult weight, four fifths of adult chest girth and speed of motor reactions, and one half of the muscular strength he will possess at twenty-five. Girls at twelve usually are slightly nearer adult physical status than boys are at thirteen. Probably by the age of eleven and one half years they are at corresponding stages. Other notable changes in physique during adolescence have previously been noted (Chapter II).

Mental traits. We have also seen (Chapters IV and V) that by the beginning of the teens the youth is far advanced in mental development, but that he probably is not as near adult mental ability as many interpreters of the army mental tests would have us believe. In fact, he is probably farther from adult mental capacity than is indicated by studies employing existing intelligence tests in which school tasks and

other materials more appropriate to childhood and early adolescence bulk so largely. Whatever the truth may be in this respect, we are reasonably sure that no new intellectual traits arise during these years. We should note, however, that independence of thought, critical judgment, ability to deal with abstract relations and generalizations, the broad grasp of complex situations, and other similar traits probably show much greater growth than memory, perception, and the ability to learn relatively simple sorts of things. The youth's general mental growth and his wider experience of life's activities account for part of his growth in independent judgment, but it is highly probable that his sexual maturing exerts a powerful influence also. His whole outlook is toward the future. He feels that he is coming to be a man. The problems of the adult world begin to grip him. In muscular strength, motor skill, in size and weight, and in many other capacities he is approaching manhood. He is becoming conscious of his powers. All the forces within him are leading to maturity. He is treated more as a grown-up. If the endocrine glands exert even a small part of the influence upon human personality that has been claimed for them, then maturation is a powerful influence in effecting some of the changes so noticeable during the teens.

By the dawn of puberty the youth has acquired a certain modicum of skill in language, number, fundamental measures, reading, and other common ways of doing things. For many purposes he is passably well equipped. If he continues in school, he is likely to be stimulated to further improvement along these lines; if he becomes a wage-earner, he may not improve — may indeed lose some of the skill he already possesses — but may acquire other habits.

Moral and social traits. The young adolescent has been developing such moral habits as truthfulness, trustworthiness, honesty, unselfishness, kindliness, cheerfulness, con-

scientiousness, respect for authority, social adaptability, and other traits such as initiative, self-confidence, coöperation, leadership, courage, physical self-control; or he may have been developing their opposites. At the worst, his training during infancy and childhood has tended to build up and establish undesirable habits, to strengthen selfish, anti-social impulses, and to form many wrong moral ideas. At the best, the youth of thirteen or fourteen has formed many necessary and desirable habits and ideals. He has learned to be generous and unselfish on many occasions, to be kind and polite, to be generally truthful, honest, and dependable, to coöperate with others in many group activities, to perform accustomed tasks before engaging in play or other recreations, to refrain from bullying smaller boys, to be open, frank, fearless, and manly in many respects.

These traits are not firmly fixed. On occasion the boy may show wide variations in some of them. When they and other traits become so firmly fixed that the boy no longer shows any variation in them, he is not a boy — he is a man in middle life. We are likely to find some variation and inconsistencies in the behavior of the lad of eighteen and the man of twenty-five; but the normal trend is for many tendencies to become more firmly fixed. Social conformity in many matters becomes a well-established behavior pattern.

Self-assertion is likely to have been modified, and begins to find its place in a more permanent scheme of things. The stronger sex impulses of the teens are a powerful drive, whose influence permeates many of the activities in which the youth engages. Often the adolescent's boldness, self-assertion, and bluster, do not truly indicate his real self any more than does, on other occasions, his assumed indifference; all may really be symptoms of shyness, a sort of protective response concealing his timidity, especially in the case of older youths. The average college graduate does not leave

his *alma mater* with all the cocksureness and overweening self-confidence annually depicted by the cartoonists about the time of commencement.

We have previously noted that gregariousness and social approval and disapproval play a larger rôle during the teens than during the pre-adolescent years. The selfish sanction of conduct in early childhood tends to be modified by regard for group opinion and welfare. As the youth identifies his own good with that of the group, and as greater maturity of thought and purpose strengthens his altruistic impulses and clarifies his ideals, a larger proportion of his behavior is likely to be determined by what he regards as good for his group.

If we add to the foregoing traits a wide range of interests, many enthusiasms entailing a vast deal of activity along varied lines, strong heterosexual interests, and an eager anticipation of the future, we begin to see something of the rich, pulsing life of the adolescent boy. The girl in the teens resembles the boy in many respects. She also differs from him in many others; but we are inclined to regard some of the differences as largely the result of the different training to which the customs of the times have subjected her. Coquetry and other allied traits closely associated with sex make their appearance and may become quite prominent during the teens. The adolescent girl also is likely to be less aggressive in many ways than the boy, but even in the case of this trait, which is commonly regarded as peculiarly masculine, we often find some girls possessing more of it than many boys.

2. *Personality traits of intellectually gifted adolescents*

Popular opinion based upon the doctrine of compensation. Popular opinion probably is nowhere more in error than in its appraisal of the personality of mentally gifted adolescents. Here the doctrine of compensation is vigorously ap-

plied. In general, it should scarcely need be said that having a good mind does not *per se* handicap the adolescent in developing an effective personality, and yet popular prejudice often seems to regard the possession of much intelligence as a detriment.

Physical traits. We have already seen that the intellectually gifted adolescents slightly excel in many physical traits those of less intelligence, but that the two groups overlap considerably. We cannot predict mental status from physical status, nor physical traits from mental capacity, because the relationships are not close, but we are reasonably sure that the bright youth is no more likely to have some physical deficiency than is the youth of average or less than average mentality; in fact, whenever differences in physical traits are found they are more often in favor of the mentally gifted youth.

Intellectual traits and interests. The most significant differences between the personality traits of intellectually gifted adolescents and those of average mentality relate to intellectual traits and interests, as one would naturally suppose. Other traits may be present in widely varying amounts. Here is a brilliant boy of thirteen described [1] as having all-round ability, a winning personality. A bright lad nearly fifteen years old is very studious, does well in all school work, is "pensive, very shy, and retiring in a crowd of boys." A bright girl of fourteen in the fourth year of high school is in good health, well-developed physically, excellent in school work, a leader in all kinds of school activities, well-liked by pupils and teachers. Another girl of fifteen of superior mental endowments ranks high in scholarship, has all-round ability, a keen sense of humor, but not very good health; is inclined to worry over school work.

[1] See Terman, *Intelligence of School Children*, chap. 11, for this and the three following cases.

Case studies of gifted adolescents. We will next describe the personality traits of a number of gifted adolescents, using case studies for the purpose.

1. *Fred C.*, a bright boy of fourteen in IX A^1, is well-developed physically, is making top scores in all academic subjects and in shop, does very fine work in music; is clean-cut, attractive, popular, a leader among boys and girls, dependable, really a prince of a chap.

2. *C. E.* at twelve was well-developed physically, in good health, a fine-looking manly chap, leading his class (VI A) in all academic subjects and doing very good work in manual training. He had lost part of a year in Grade III on account of sickness. His work was of such uniformly high quality, required so little effort, and he was in such good health that extra promotion was suggested to him, although it was but six weeks until mid-year examinations and promotions. He asked for time to look over the textbooks used in VII B to see if he thought he could do the work of that grade. In a few days he indicated his willingness to try VII B, and was promoted. At the mid-year examinations his marks were all well-up in the 80's and he went into VII A. His work in Grade VIII was uniformly good. He entered ninth grade when $13\frac{8}{}$, and at once joined the basketball and debate squads. A brilliant debater before he was fourteen, he showed, in rebuttals, a remarkable grasp of principles and a wealth of pertinent facts on important social, economic, and political questions. He was inclined to be severe and uncompromising in judging other people; he was equally as impersonal and severe in judging himself. He was disliked by his associates of less ability on account of his frankly expressed, uncompromising judgments. He possessed an uncanny clarity in seeing the point in social and intellectual problems, and faced situations frankly without emotional disturbance.

Becoming greatly absorbed in reading materials on debate questions, he allowed his class work to slump during the middle of IX B. The high-school principal called his attention to his marks the previous six weeks, saying, "Look here C——, you're getting down in your school work. If you don't keep your classwork up, you'll have to drop debate." C—— said, "But none of my marks is below 80." "That's true," agreed the high-school principal, "but you ought to have no grade below 90." The boy looked at the principal a moment, and then replied, "Well, I can't help the past, but I can take care of the future," and he did. He went at

once to his teachers and asked them frankly what was wrong with his work and what they thought he ought to do to bring it up. He soon had his work back in the 90's, and kept it there. He played on the high-school basketball team three years, was on the debate teams all four years in high school, was business manager of the school paper during freshman and sophomore years, and editor during junior and senior years. School work was always very good or superior.

3. *H. H.* was a brilliant high-school student, a leader in debate, football, baseball, and other student activities. He was well-developed physically, popular with all groups of students, clean-cut, straightforward, reliable, full of fun, the soul of honesty, a fine all-round boy. College and university careers were similar to that in high school; he was a leader in all activities, scholastic as well as social and athletic. He majored in chemistry and biology in college, and in biology in university.

4. *E. J.* was a brilliant student; he was at the head of his class in scholarship all through high school; his health was good but he was small. He had little interest in extra-curricular activities; was well-liked, but not a popular idol like H. H. He was extremely sensitive and of a jealous disposition. Social-adjustment difficulties, although slight in high school, became quite marked in later teens and early twenties.

5. *L.*, a very brilliant high-school senior,[1] of 16 ^{6}, was doing excellent work in all his school studies, mixed well with his fellows, and was very likeable. He was especially interested in chemistry and physics. He carried an unusually heavy burden at home (cooking meals, etc.), due to the fact that he was the oldest child and his mother was bedridden for years. His health was good up to 16; at that age he had inflammatory rheumatism, followed by chorea.

6. *T. G.* at twelve entered ninth grade; she led her class in scholarship for two years in a small high school, and did excellent work during the last two years which were spent in a city high-school of 2000 pupils. She was quite athletic and starred on high-school basketball team all four years. She was popular with boys and girls alike; was inclined to be blunt in manner, and lacked some of the social graces, probably through lack of home training or indifference. She never worried; was honest, reliable, cheerful, and full of fun; her health was good, but she was short and slender.

[1] See Yates, *A Study of Some High School Seniors of Superior Intelligence*, pp. 68–69.

7. *M. M.*, a brilliant student in the same class as T. G., was a bookworm. She played basketball a little during first two years of high school; was quiet as a mouse, had a dun-colored personality, good health, and no leadership; was pleasant, well-liked, had more of the social graces than T. G., but was ill at ease in large groups. During the last two years in high school (her sixteenth and seventeenth years) she was boystruck; went to parties, dances, and all sorts of social functions. She was quite vivacious and gay in a crowd of boys and girls, and showed traits quite at variance from those of the immediately preceding years. School work was always maintained at a very high standard.

8. *L. R.* at nineteen was graduated in Arts and Sciences from one of the universities of the American Association, with a uniformly fine scholastic record. She was very delicate during her elementary-school days, and frequently was absent from school on account of ill health, but in high school and college her health was very good. She finished the four-year high-school course in two years and a nine-weeks summer term, with all marks above 90. She was below norms in height and weight during high-school and college years, and is still below them at the age of twenty-five. She was well-liked by students, quite at home in large or small groups; made national sorority on opening of rushing season her first year in the university. She was independent in thinking, possessed abundant energy, was sympathetic, honest, and trustworthy, and had a keen sense of humor. She was impersonal in many judgments; was somewhat selfish at times; and never worried.

9. *H. H.*, a very bright girl, was small, under-weight, and was frequently absent from high school several days at a time on account of sickness. Because of her poor health her parents allowed her to do very little homework. Under these conditions her mental ability alone enabled her to graduate from high school just before reaching her sixteenth birthday. Overwhelming financial reverses, just as she entered high school, completely changed home conditions, and may have had an influence upon some traits which were noticeable during her high-school career. At any rate, she was selfishly ambitious, unsympathetic, inclined to worry, took little part in extra-curricular activities, was unpopular, and had no real student chums. She and her mother alone seemed to be chums. She lacked in social leadership. On the whole, she illustrates admirably the personality traits often attributed by popular fancy to adolescents of superior intellectual endowments.

10. *Ethel G.* at the age of fifteen years was five feet, six inches tall, and weighed 125 pounds. She was very active, of athletic build, and rather good looking. Her I.Q. was 132. She was in the second year of senior high school. She possessed qualities of leadership, was very popular, frank, fearless, honest, and fond of outdoor sports. She was elected class president, but having failed in two subjects had to give it up. She was frank in meeting this crisis in her school life, worked hard, and soon had her school work above standard. If something distasteful is to be done, she says, frankly, "I don't like it, but I intend to do it anyway." She is very fond of social approval. She cares more for athletics than for reading. She enjoys competition. She likes nature books, and romantic stories; she showed much originality in geometry and English. She is well-poised, full of fun, sometimes noisy, a very wholesome, thoroughly likeable girl of considerable intellectual, social, and athletic promise.

The foregoing sketchy case studies are, the writer believes, quite typical of mentally gifted adolescents, and reveal a widely diversified list of personality traits. On the whole, they indicate, as we would expect, that both desirable and undesirable traits are found among adolescents of high intellectual capacity. If no mention were made of mental endowment or scholastic records, the reader would find it quite difficult to appraise them accurately from a knowledge of the other traits, although he might feel that many of these folks must be above the average in intelligence. Probably the general impression given by these abbreviated accounts is that desirable personality traits average somewhat better among the gifted than among those of average mental ability; and this apparently is not far from the truth.

Group studies of personality traits of gifted boys and girls. At this time we should briefly examine some of the more significant results of recent investigations. Terman and Goodenough [1] secured ratings of more than a thousand

[1] *Genetic Studies of Genius*, vol. I, pp. 519–55. See also Terman, *Intelligence of School Children*, chap. 10, for data on other gifted children.

children of ages five to fourteen years, about equally divided into gifted (I.Q. 140 and up) and control or normal groups. While the results are essentially the same at all ages studied, we consider the results for ages twelve to fourteen. The gifted had better ratings than the pupils of average intelligence in the following traits: (1) health; (2) physical energy; (3) prudence and forethought; (4) self-confidence; (5) will and perseverance; (6) musical appreciation; (7) appreciation of beauty; (8) sense of humor; (9) cheerfulness and optimism; (10) permanency of moods; (11) leadership; (12) sensitiveness to approval and disapproval; (13) desire to excel; (14) sympathy and tenderness; (15) conscientiousness; (16) truthfulness; (17) desire to know; (18) originality; (19) common-sense; and (20) general intelligence. The group of average intelligence had better ratings than the gifted group in: (1) fondness for large groups. The two groups were rated about the same in (1) freedom from vanity and egotism; (2) generosity and unselfishness; (3) popularity; and (4) mechanical ingenuity.

Yates [1] made a careful study of twenty-five high-school seniors of superior mental ability, comparing them with twenty-five seniors in the same school who had average mental capacity. The average group excelled *slightly* in general health. The superior group reached physiological maturity approximately a year earlier. They also had more interest in school, especially in such subjects as science, history, English, and mathematics. They did much more reading, especially home reading, than the average group, although the two groups had about the same number of working hours per week out of school. The brighter group, on the whole, were as much interested (or slightly more so) in objective things and activities, in sports, music, athletics, people, and social situations as the group of average men-

[1] *Op. cit.*

tality. They also excelled in leadership. In art (drawing) alone did the average group excel.[1]

3. *Personality traits of adolescents of normal intelligence*

As we have seen in the preceding section, intellectually gifted adolescents generally excel in many other traits, although the two groups overlap a great deal. When we select some particular trait not essentially dependent upon a high degree of intellectual ability, and compare adolescents of various intellectual levels but of the same social status, we find that the differences are not very great and that many individuals of normal intelligence excell those of superior intelligence, and *vice versa*. If, however, we compare youth of different intellectual abilities and of different environmental circumstances, we find them less alike in many personality traits than before.

Case studies of adolescents of normal intelligence. We will next give a number of case studies of adolescents of normal intelligence.

1. *Dorothy L.*, age seventeen, height 64 inches, weight 125 pounds, I.Q. 92, is doing average work in the eleventh grade. Her health has been fair. She is friendly with girls, but has only a few chums. She is reserved and shy with boys her own age but quite free in playing baseball with younger boys. She plays tennis some, but prefers to watch others; likes to walk alone in lonely places, is much given to worry, and easily becomes hysterical. She is troubled some by insomnia. She is exceedingly sensitive to praise or blame, is obedient, generally good natured and trustworthy; does not possess a great deal of initiative, self-confidence, or leadership.

2. *Ruth B.*, age seventeen, height 62 inches, weight 110 pounds, I.Q. 98, is a very ambitious, hard-working student doing good work in the senior year of high school. Health is and has been good. She has many intimate girl friends, but is very bashful with boys.

[1] See also Jones, Alice M., "Analytic Study of 120 Superior Children"; in *Psychological Clinic*, vol. 16, pp. 19–75.

She is somewhat shy and often self-conscious and awkward. She is polite, obedient, kind, honest, conscientious, very impulsive, but persistent even when greatly upset and discouraged; has initiative but is too shy in larger groups to show much leadership.

3. *Evelyn R.*, age not quite sixteen, height 66 inches, weight 124 pounds, I.Q. 98, was doing average work in eleventh grade at the time these observations were recorded. Health was good. She was self-assertive, bold, free with both boys and girls. She was openly and persistently boy-struck, although not particularly popular with them. She was quite athletic but a poor sport, doing unfair things at times to win. She played tennis, and volley ball, was an excellent swimmer, finding much pleasure in taking risks in swimming and diving. She had qualities of leadership which have since developed a great deal. She was inclined at times to be self-willed, stubborn, and rebellious, but was generally kind and cheerful.

4. *Louise L.*, age fourteen, height 62½ inches, weight 104 pounds, I.Q. 96, does average work in the second year of junior high school. Health is very good. She is timid, probably because other girls her age have often made fun of her poor and shabby clothing (her father is dead and the mother has worked for years to support the family). She does not make friends easily and prefers the companionship of younger children. She hates boys and has nothing to do with them either in school or out. She is interested in music and reading, plays very little, and is not a leader. She has a strong sense of honor, is sensible and dependable, has an unselfish, lovable disposition.

5. *Ethel M.*, age fourteen, height 63 inches, weight 115 pounds, I.Q. 102, is doing very poor work in second year junior high school. Health good. She is boy-crazy, quite gregarious, and socially inclined; spends all of her free time with a group of girl chums, and is utterly miserable if alone for a few minutes. Although well-liked and showing much initiative and energy along certain lines, she is not a leader. She is not athletic, but feels that she is beyond the playing age, dances a great deal, and spends much time loafing in a drug store with girl friends. She is polite, tries to appear indifferent to the things in which she is most interested, and seems shallow and superficial. Her parents do not know how to give her wise guidance and control.

6. *John C.*, age seventeen, height 71 inches, weight 151 pounds, I.Q. 108, is doing good work in the last year of senior high school.

His health is and always has been good. He is very sensitive, often thinks himself misunderstood, and imagines intentional slights. He is very serious-minded, is not a leader, dislikes responsibility, is truthful, straightforward, self-willed, quick-tempered, and dislikes parental control which has never allowed him much freedom. He makes friends easily, although at first he is reserved and shy. He has several close friends, but prefers the companionship of one or two to that of many. He is very enthusiastic and exceedingly patient and persistent over the activities involved in his many hobbies. Recently he has become interested in girls.

7. *Charles G.*, age sixteen, height 68 inches, weight 130 pounds, I.Q. between 90 and 100, was doing just fair work in tenth grade at the time these notes were made. Health good. He was not a leader. He was full of fun and life, bubbling over with energy, always in trouble at school. He enjoyed athletics, expecially baseball, football, skating, and swimming. He was quick-tempered, good-natured, not always truthful or dependable, sometimes moody and selfish. He often formed judgments too hastily; attention was not well-controlled, nor was he very persistent. He was inclined to be superficial, was quite suggestible at times, liked to be with a crowd of boys, but had no interest in girls.

8. *Edward W.*, age fifteen, height 62 inches, weight 117 pounds, I.Q. 106, is doing good work in the third year of junior high school. Health good. He is interested in all forms of athletics but more as a spectator than as a participant. His verbal knowledge of athletic games is much greater than his actual skill in playing them. He is quite enthusiastic over things which he never gets done. He is suggestible, fears being called weak, and is much influenced by group opinion. His athletic interest may be compensatory, because he seems physically timid. He is frank and seems frankly self-critical; is polite when he cares to be; and likes to argue upon a wide variety of topics. He is not interested in girls, but treats them like boys. He is interested in science and mathematics but hates French and Latin. He seems active, but really lacks initiative, aggressiveness, and qualities of leadership.

9. *Charles S.*, age fourteen, height 67 inches, weight 128 pounds, I.Q. 101, is doing good work in the eighth grade. He is very active, is a leader, chums with other boys, likes all kinds of athletics, is self-confident, strong-headed, and domineering. He likes most to work with tools and with his hands. He has a fine sense of honor,

is dependable, is sometimes self-conscious, and seeks attention through excellence in sports.

Both case studies and detailed reports on groups of adolescents of normal intelligence show such variations in personality traits as make general descriptions difficult. This fact is not disturbing, however, since a certain amount of variation is desirable and since improvement is best secured through training arranged to meet individual needs.

Overlapping of personality traits. The overlapping of the personality traits of adolescents at different levels of intelligence is shown in Figs. 71 to 76. It is noteworthy that, although many of the superior individuals have less of these traits than many of those of average or below-average intelligence, yet the average ratings of the former exceed those of the two latter groups, subject, of course, to the inaccuracies of such ratings.

4. *Personality traits of adolescents of subnormal intelligence*

The most important differences. The chief characteristics differentiating the personalities of the intellectually normal and subnormal relate to intellectual traits such as capacity to learn, and judgment in complex situations, including ability to foresee consequences. These are very important elements in making adequate social adjustments. Self-control, for example, involves the inhibition of antisocial instincts and impulses. Inhibition seems to be secured most effectively not by the negative fiat — an explosive "I will not"; but rather by an immediate awareness of the nature of the impulses, of the things to which they lead, and of their annoying concomitants, or by such a quick understanding of their undesirability and a centering of attention upon more satisfactory modes of response as substitute, almost instantaneously, desirable responses in their stead. Of course, habituation plays an important rôle in

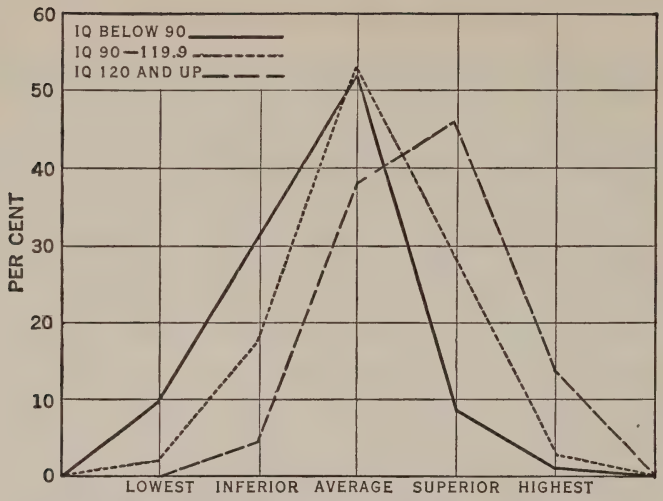

FIG. 71. LEVELS OF INTELLIGENCE AND COMBINED RATINGS ON QUICKNESS OF THOUGHT AND RETENTIVENESS OF MEMORY

N = 1030 high-school students. (Calculated from data from Hughes.)

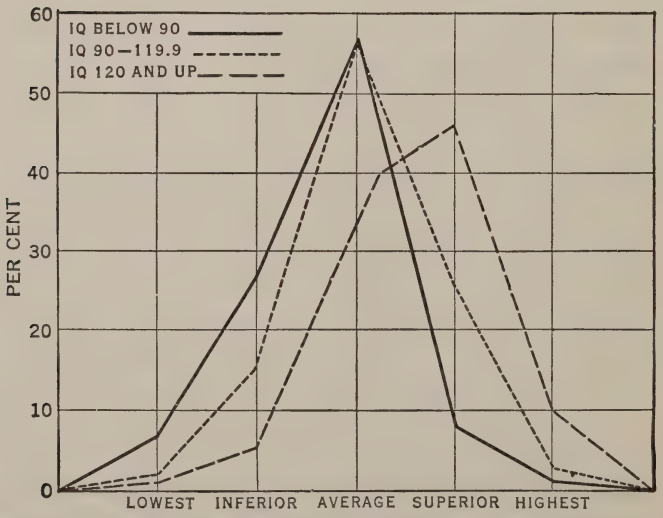

FIG. 72. LEVELS OF INTELLIGENCE AND COMBINED RATINGS ON FORCE OF PERSONALITY AND INITIATIVE

N = 1030 high-school students. (Calculated from data from Hughes.)

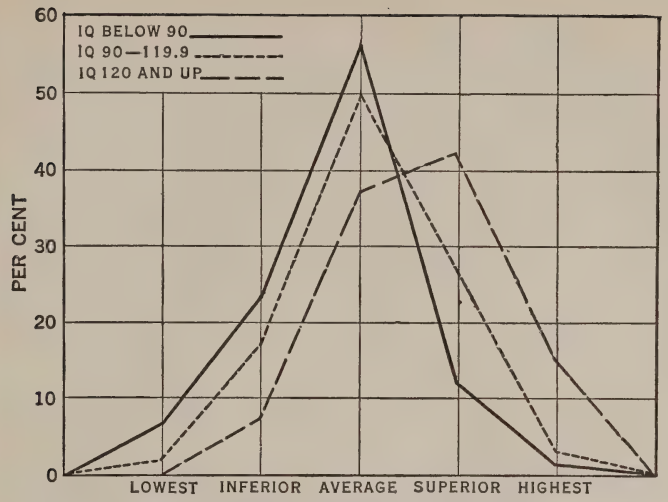

FIG. 73. LEVELS OF INTELLIGENCE AND COMBINED RATINGS ON CONTROL OF ATTENTION AND SENSE OF ACCURACY

N = 1030 high-school students. (Calculated from data from Hughes.)

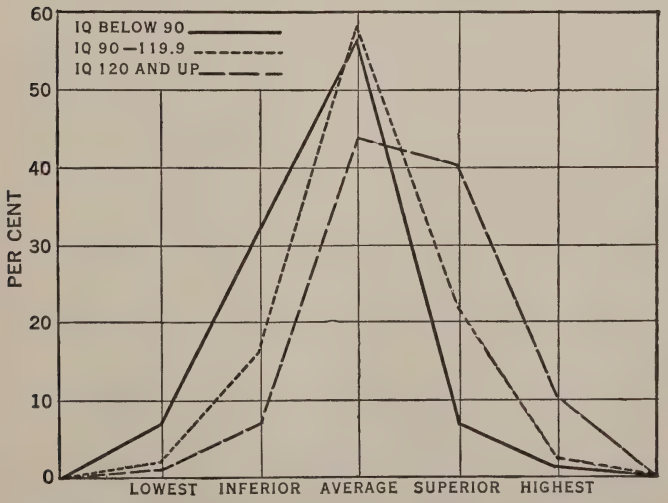

FIG. 74. LEVELS OF INTELLIGENCE AND COMBINED RATINGS ON CAPACITY FOR LEADERSHIP AND SELF-CONFIDENCE

N = 1030 high-school students. (Calculated from data from Hughes.)

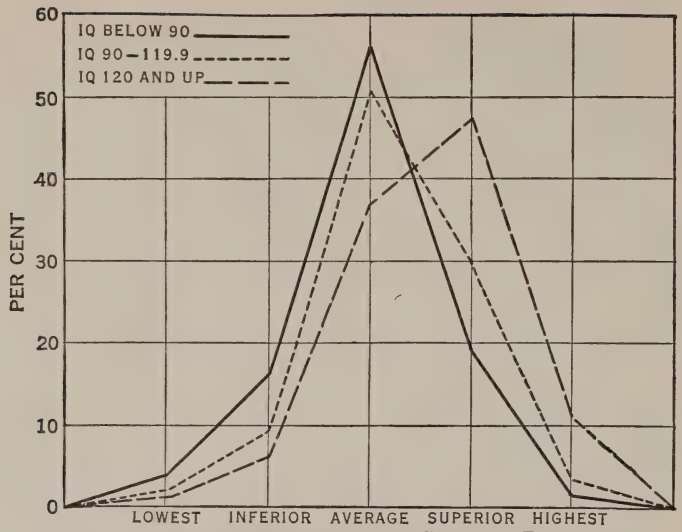

FIG. 75. LEVELS OF INTELLIGENCE AND COMBINED RATINGS ON COÖPERATION AND REGULARITY

N = 1030 high-school students. (Calculated from data from Hughes.)

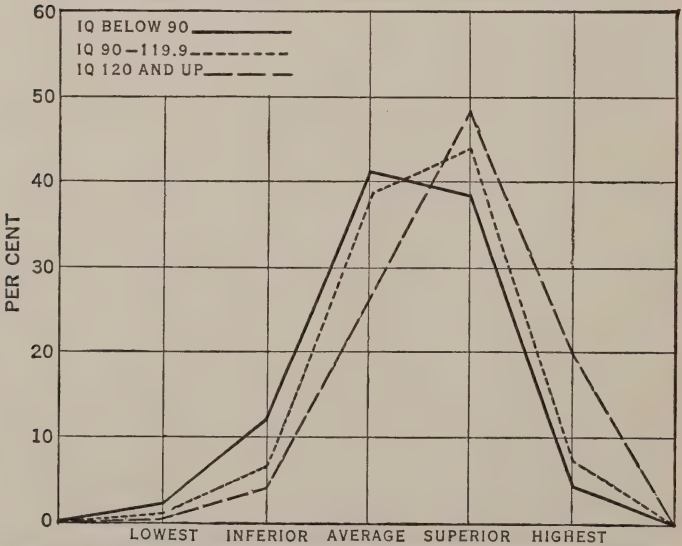

FIG. 76. LEVELS OF INTELLIGENCE AND COMBINED RATINGS ON TRUSTWORTHINESS AND RESPECT FOR AUTHORITY

N = 1030 high-school students. (Calculated from data from Hughes.)

building up self-control, but the part played by intelligence also is important, even in initiating the habituation.

Intelligence is quite significant in many traits conditioning vocational efficiency, especially those requiring ready adaptation to new and complex conditions, and those involving critical appraisals of various possible procedures. In respect to such traits as these the mentally deficient adolescent is described by the very fact that he is mentally deficient.

Mental deficiency sets certain very important limits to achievement and to the development of personality, but this does not imply that personality is entirely a matter of intelligence. The fact that personality includes much which is not subsumed under intelligence may be quite readily observed, either by making a list of forty or fifty traits broadly describing a few adolescent boys or girls whom one knows very well and selecting those traits which are clearly a matter of intelligence, or by noting the differences in personality amongst a group of high-school boys or girls of the same age and mental ability.

Case studies of subnormal adolescents. Further information may be secured from the following case studies of adolescents of subnormal intelligence.

1. *Harry*, age fourteen, had an I.Q. of 24 and was in the first grade in a parochial school. Height and weight were normal. His eyes were loosely set in their sockets and seemed to sag considerably. His mouth usually hung half-open, and he had an idiotic stare. His muscular coördinations were defective; he had no motor skill and could scarcely walk up and down stairs unaided. He was dirty, unkempt, and careless. His manner was mild and apathetic. He took little interest in what went on about him. He was not excitable, never manifested any strong emotions, was neither selfish nor unselfish; in fact, one could discover in him only a few traits characteristic of human beings. At school he could not be induced to play, while at home he was content to watch half-heartedly the movements of dog, cat, or other animals. His general incompetence was so pronounced and his passivity and lack of

initiative so complete that, if left to his own devices, he probably would have confined his activities to the purely vegetative functions. Cases of extreme mental deficiency, such as this one, indicate the fundamental importance of intelligence as an element in personality.

2. *Walter*, age fifteen, I.Q. 45, was a big overgrown boy who had attended rural school several years, but had made no progress. When he moved to town he entered the second grade of the public schools but did very poor work even in that grade. At the suggestion of the school authorities he was later sent to the state school for feeble-minded. He matured at fourteen, was quite strong physically, and did considerable simple rough work at home. He was truthful, kind-hearted, unselfish, lacked initiative, was easily confused, was very suggestible, had no perseverance, no capacity for planning, and very little ability to do things. Speech habits were slovenly. He was slightly stooped and walked with a slouch. He was quick-tempered, but his temper outbursts, mostly verbal, were entirely harmless to persons, even to the smaller children who often teased him.

3. *Julia*, age sixteen, I.Q. 70, came from a good home. Her parents were very ambitious for her success in school. Through their influence and on account of her "long and faithful service" in grades four, five, and six, she was finally promoted to seventh grade, although she could not do good fifth-grade work. She was neat, fairly attractive, very well-developed physically. She was a steady, reliable, quiet, unobtrusive girl who tried hard to meet the demands placed upon her by home and school. She had a sweet, patient, kindly disposition; was very sensitive, but not highly emotional. She had little initiative, but persevered well in activities upon which she was started. She fitted well in an environment that did not require much abstract intelligence. Her generally cheerful and happy disposition was often disturbed by her failure in school tasks which never should have been forced upon her by parental ambition.

4. *Lucy*, age eighteen, I.Q. probably not more than 40, was Harry's sister. She too had attended parochial school for many years and had reached the high-first grade, where she seemed to be lodged permanently. She differed from her brother in many respects. She had energy and vigor, was clean and very neat, and could carry on a very, very simple conversation. She was self-centered, slightly deceitful, but quite respectful of authority.

There were no sex irregularities. She was much interested in clothes, but showed no strong interest in persons of the opposite sex. Aside from a slight tendency to deceitfulness, she seemed to be generally reliable. She was not easily led, but had considerable force. She was neither obtrusive nor shy. Home conditions were bad. Father and mother were first cousins. Mother was definitely feeble-minded, and father probably also. Her mother was quiet and retiring, but the father was violently aggressive, especially at readily imagined slights. The house was filthy with dirt, and in a generally run-down condition. One marvels how Lucy came to be so neat, especially since she seemed to feel no shame over the dirty, unkempt appearance of her younger brothers whom she piloted afoot every day to and from school, or over her filthy home toward whose improvement she did absolutely nothing.

Case studies might be supplied at great length from the training schools for the mentally deficient and from the opportunity classes in public schools; but the ones we have presented are sufficient to indicate not only the wide variety of traits possessed by those of subnormal intelligence, but also the difficulty of making sweeping generalizations. Generally we find a baffling array of widely divergent traits. Both positive and negative qualities are characteristic.

Negative traits among subnormal adolescents. One study [1] shows a list of eleven negative traits characteristic of feeble-minded individuals who are below or just at "the borderline of social normality." The list is as follows: [2]

1. Lacking planning capacity in a new situation, poor executive ability.
2. Lacking initiative or volition, dependent on others for impulse and direction.
3. Irresolute, easily confused.
4. Nervous and excitable, over-emotional.
5. Silly or obtrusive. Loud or forward.
6. Simple, suggestible.

[1] Porteus, *A Study of Personality of Defectives with a Social Ratings Scale.*
[2] *Op. cit.*, pp. 8–9.

7. Impulsive, imprudent, tending to act without due consideration.
8. Persistent moods, such as obstinacy, foolish elation, seclusiveness.
9. Bad-tempered, quarrelsome, over-resentful of criticism.
10. Imprudent, disobedient, disrespecting authority.
11. Cunning, sly, deceitful.

It is obvious that these negative qualities also are found among adolescents of normal and superior mental endowments. In these traits, as in many others, the groups overlap, especially in traits in the latter part of this list.

The mentally deficient adolescent is likely to be inferior to those of greater intelligence in those traits whose acquisition is facilitated by ready habituation or learning. In the final analysis, however, the total organization of traits is very significant; for example, leadership, initiative, or aggressiveness combined with anti-social tendencies renders a youth dangerous to society.

5. *Personality traits of delinquent adolescents*

Delinquent adolescent personality. A composite picture of delinquent adolescent personality is not easily drawn and would be of doubtful value if portrayed, since traits vary so much from one delinquent to another. Many traits are unrelated to a particular form of delinquency, or the relationship is very remote and of no significance. Aggressiveness, persistence, suggestibility, leadership, attitude toward reality, and many other traits vary in amounts among delinquents. Numerous case studies show individuals normal in many ways, but different in a few traits closely related to the kind of delinquency. Other case studies reveal deficiencies in a wide range of personal characteristics. We need not be disturbed, however, because we cannot pick out a large number of traits which are universally found among delin-

quent adolescents. Generalized, all-round characterizations are a sort of highest common divisor anyhow and are of relatively small worth, just because so many significant features are omitted. Average human behavior is significant, but its significance is enhanced by a knowledge of individual variations from it.

Case studies of delinquent adolescents. The few data which follow are approximately typical of those collected in recent years by the various individuals and social agencies that have contacts with this group of young people.

1. *A. G.*[1] at sixteen had a Binet mental age of nine years. The psychiatric diagnosis was "low-grade intelligence with a poorly balanced instinctive foundation." He entered school at seven, and spent two years in a grade. He was in the fourth grade when he left school at fourteen. His older brother was a vagrant. His parents died (1918) when he was fifteen years old. Four kind-hearted neighbors in succession tried to care for him but found him "a most degraded and profane character." He worked but little, was ungrateful, quarreled, and cursed. He preferred to sleep in barns. He gambled, losing $75 of war-time wages with no concern whatever. He was brought to the juvenile court because he was not working and was not in school. He could not be found for two months. When found, he was placed on probation in a job as rivet sorter at a shipyard at $20 a week. This job he could not hold. He was then sent to the Maryland Training School for Boys.

2. *R. R.* had a consistent truancy record dating from the primary grades. His mother died when he was ten. His father, a successful business man, was indulgent with his boys, allowing them too much money and providing no wise guidance and control. An older brother was a wild, well-dressed, fine-looking, ne'er-do-well. At fourteen R. R. was in the seventh grade, doing good work — whenever he was at school. At this time he was brought into juvenile court for truancy and stealing. He was a fine-looking boy, frank and talkative. He was well-developed physically and could easily pass as a boy of sixteen or seventeen. He matured at thirteen. His mental ability was considerably above the average; he did excellent work in arithmetic, read history as a sort of romance,

[1] From an account in *Report of Maryland Mental Hygiene Survey*, 1921.

and was especially interested in travel and adventure. He was full of life and bubbling over with energy which usually kept him in trouble during school hours. From casual observation one would expect him to be popular and a leader among boys his own age and size, but he was not. He had few boy friends — usually one inseparable chum. Despite his open countenance and frank manner he was deceitful. He was frequently in fights, many of them following his attempts to cheat in games. He was quick-tempered. Many times he had tried to run away from home. Once when he was thirteen he had stolen rides on freight trains to a neighboring city one hundred and fifty miles distant. The climax came when he refused to go to school and, with another boy, was found guilty of several thefts for which no motive was found. He was sent to the state training school for boys.

3. *R. C.* was a stupid, lazy big fellow of fifteen. Mentally he classed "very dull, near borderline." School work was and always had been uniformly poor. He was in the fifth grade and seemed to be lodged there permanently when he quit school. He was slow and awkward of movement, had little skill in games, did not get along very well with boys his own age or younger. He was not dependable, and lied when the truth would have served his own selfish purposes better. He was careless of his appearance, dirty, rude, slovenly in speech; seldom got angry, seemed tired much of the time. His only physical defects were slight near-sightedness and adenoids. His father was a self-acknowledged thief, and the son, from an early age, was following in his footsteps. The boy displayed no leadership, no fine social qualities, was coarse and rough.

Dr. Jessie Taft[1] reports the following case:

4. *Ruth*, fourteen, Irish, pink-cheeked and blue-eyed, in her first year of high school, the picture of attractive, innocent girlhood, had been taken to the house of detention for stealing a diamond pin and taking money from a teacher's desk. When her denials were finally broken down by proof, she confessed to a long history of petty thieving, hitherto unpunished and for the most part undiscovered. She was impulsive, impatient, easily discouraged, egotistic, desirous of social approval, had never learned to work to secure the

[1] "Some Problems in Delinquency — Where Do They Belong?" in *Papers and Proceedings of the American Sociological Society*, vol. 16, pp. 186–96.

recognition she so much desired. She resented bitterly any failure or hardship, and "at once turned to some pleasure experience as a compensation." Very unfortunate home conditions — the death of her mother, her father's questionable character, and the petty quarrels of her father and stepmother — helped develop a "cynical, suspicious, critical attitude toward everything and everybody."

Ruth was so absorbed in the injuries done her by life that she thought of nothing but pleasure compensations. She would face nothing that demanded effort or any unpleasantness. She had a right to take things because life owed her reparation. She saw nothing in school or work, or the ordinary habits of daily hygiene but hardship to be avoided. She wanted nice clothes and felt she had a right to take them, but she saw no reason why she should take any care of them. If a garment was torn or dirty, get a new one. She thought she ought to be placed where there were servants so she would have no housework and no laundry to attend to. She had no loyalty to any one. She played one person against another and used everything to her own advantage as she saw it.

Physical traits. If it were true, as Lombroso maintained, that criminals are set off from the remainder of the population by certain anomalies of physique, we might then expect many delinquents to have physical characteristics differentiating them from the non-delinquent. Certain writers have laid much stress on the alleged malnutrition and physical underdevelopment of delinquents and criminals, but Lombroso's view is thoroughly discredited now.[1] Anthropometric measurements of juvenile delinquents not only give no grounds for trying to apply any modified form of his theory to them, but, on the contrary, indicate the good physical development and nutritional status of many of them.

Differences in height and weight are often found.[2] Some-

[1] See, for example, Charles Goring, *The English Convict: A Statistical Study*, 1913.

[2] See references (3) at end of this chapter, especially Pyle, 1914, Faber and Ritter, 1917, McCord, 1919, Mathews, 1923, Burt, 1925, Healy and Bronner, 1926.

times a group of delinquents average below the norm in height and weight, and sometimes below in height but above in weight. They may also excel, in tests of strength, those non-delinquents of the same ages and of the same social-economic status. Whether in any case they average above or below the norms the differences are so slight, and they overlap the non-delinquents so much that the older views of the poor physical condition of delinquents must be greatly modified.

Physical over- and underdevelopment. One investigation [1] shows that a group of delinquent girls were robust, well-developed physically, and above the norms for height and weight. This is not surprising, in view of the following considerations:

(1) "In many instances it is the [girls'] very excess of vigor and their enthusiastic response to life's instinctive urges which seem to have brought them into conflict with authority." (Mathews, *op. cit.*, p. 205). Immorality is the most frequent delinquency charge preferred against adolescent girls committed to an institution, 63 per cent of the group studied by Miss Mathews being sent to the California School for Girls for that offense.

(2) These girls matured, on the average, approximately ten months earlier than girls generally do.

(3) Early maturation is associated with considerable increase in both height and weight.

On the average, four thousand repeated offenders [2] in Chicago and Boston were above Burk's [3] age-weight norms for general population, and 70 per cent of the girls exceeded the weight norms for their ages. Observation and careful investigation alike attest to the physical overdevelopment of so many girls brought into juvenile court. Healy and

[1] Julia Mathews, "A Survey of 341 Delinquent Girls in California"; in *Journal of Delinquency*, vol. 8, pp. 196–231.

[2] Healy and Bronner, *Delinquents and Criminals: Their Making and Unmaking*, chap. 14.

[3] *American Journal of Psychology*, vol. 9, pp. 253–326.

Bronner[1] comment on this fact, saying, "There can be little doubt, by way of interpretation, that physical overdevelopment tends to draw a girl's attention early to sex life and that it leads her early to be attractive to the opposite sex."

On the other hand, Burt,[2] noting the great prevalence of sickness and physical debility among juvenile delinquents in London, says: "As a general rule, however, the young offender of good physique and resistance seldom comes back again in after years as an habitual criminal. Most repeated offenders are far from robust: they are frail, sickly and infirm." From his intensive study of two hundred cases he believes that marked physical overdevelopment and underdevelopment are contributing causes of delinquency in England.

Physical defects seem to be more common among delinquents than among non-delinquents, probably on account of the ignorance, lack of proper care and training, and other unfavorable conditions which characterize the homes from which so many of them come, because delinquents and non-delinquents of the same social-economic status differ very little in prevalence of physical defects. This is the view of Faber and Ritter[3] who say: "Taken as a whole, . . . the physical defects are those common to any group of children whose hygiene has been long neglected."

From the evidence at hand, we see no reason for believing that delinquent adolescents differ very much physically from those who are not delinquent. Physical defects, of course, often place the youth under a serious handicap in adapting himself effectively to his environment, but they do not necessarily lead him into delinquency.

[1] *Op. cit.*, p. 138.

[2] *The Young Delinquent*, p. 238.

[3] "A Mental and Physical Survey of a Group of Juvenile Delinquents"; in *American Journal of Children's Diseases*, vol. 14, pp. 444–62.

Intelligence of delinquent adolescents.[1] Many people believe that juvenile delinquents are, for the most part, feeble-minded. Some pioneer investigators concluded that 50 per cent to 66 per cent of juvenile-court cases were feeble-minded,[2] and their conclusions have had wide currency and acceptance. Yet more extensive reliable data now available do not warrant any such sweeping conclusions: nor is the problem of eliminating adolescent delinquency nearly so simple as mere early segregation and institutional or other suitable care of the feeble-minded, although a comprehensive program of this sort would be a valuable attack on the problem. The prevention and cure of juvenile delinquency is far more complicated than the making of adequate provision for the feeble-minded, and for the obvious reason that delinquency, even of a serious nature, is not confined to mental defectives alone.

It is true that delinquent adolescents who become juvenile-court and institutional cases are drawn largely from the lower half of the distribution of intelligence, as we see in Fig. 77. Their ratings on the Stanford-Binet tests or on performance scales average below the mean for general population of the same ages. If we take Stanford-Binet I.Q. 100 as the mean of general population,[3] Fig. 77 shows that approximately 75 per cent of a group of repeated offenders have I.Q.'s below this norm; but it also shows that approximately 75 per cent have I.Q.'s above 80 (the upper limit set by

[1] For further data on this subject see references (3) at the end of this chapter.

[2] Space does not permit consideration of the inadequacies and questionable assumptions of some of these studies. See Miner, *Deficiency and Delinquency,* chap. 6, for a summary and evaluation of data on 9000 cases tested before 1918. Healy and Bronner, in chapter 16 of their *Delinquents and Criminals: Their Making and Unmaking,* give data on the mentality of 4000 juvenile repeated offenders in Chicago and Boston.

[3] Data indicating that this is probably too high are discussed on p. 118.

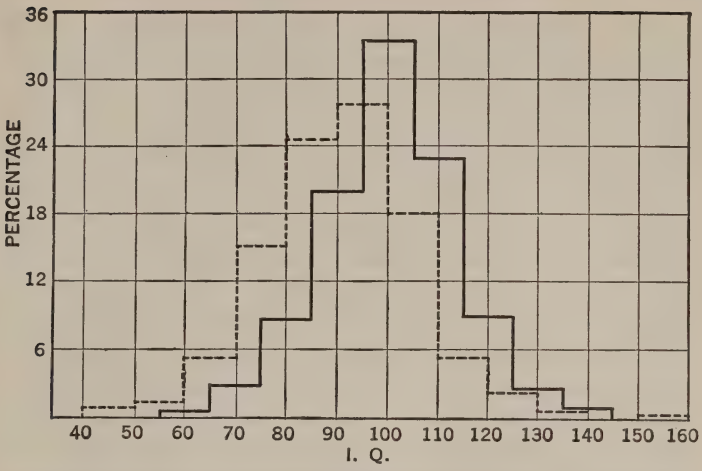

FIG. 77. INTELLIGENCE OF UNSELECTED CHILDREN AND OF JUVENILE REPEATED OFFENDERS

———— Stanford-Binet I.Q.'s, 905 unselected children. (Terman, *The Measurement of Intelligence*, p. 66.)

- - - - - - - - Stanford-Binet I.Q.'s, 1212 juvenile repeated offenders. (Healy, *Practical Value of Scientific Study of Juvenile Delinquency*, p. 19.)

Terman for borderline cases). Fig. 77 then indicates that approximately 25 per cent are feeble-minded and borderline. This agrees in general with several other careful studies, notably Healy and Bronner's[1] later results on 4000 cases of whom 72.6 per cent were "definitely mentally normal." They found 13.6 per cent clearly feeble-minded, 9.1 per cent borderline, 3.3 per cent psychotic, and 1.4 per cent psychopathic. Feeble-minded and borderline cases are thus seen to be much more common among delinquents than among general population, even though the great majority of delinquents have normal mentality. A characteristic of a weak mind is inability to foresee the consequences of acts, as well as inability to analyze and meet adequately other complex situations of life. Accordingly, it is not at all un-

[1] *Op. cit.*, p. 273.

natural to find many of them becoming delinquent. At the same time the large proportion of delinquents having normal or even superior intelligence must not be overlooked; nor must we forget that the large majority of adolescents of the lower grades of intelligence do not become delinquent.

Mechanical and motor abilities. Too little is definitely known concerning the amount and distribution of mechanical aptitude and motor ability to permit an adequate comparison of delinquent and non-delinquent youths. We indicate briefly some work that has been done, recognizing that the findings are highly tentative. Thus 222 boys and girls appearing in juvenile court in Los Angeles were given certain tests.[1] Their average Stanford-Binet I.Q. was 86, but both girls and boys made better scores on the Stenquist Mechanical Aptitude Test (Assembly Test) than the New York public school boys tested by Stenquist. Even less is known about the motor abilities of delinquent adolescents. In speed of tapping they are about the same as others. On performance tests they are found to average slightly less than general population of the same ages, but the two groups overlap so much that differences in motor abilities do not differentiate them.

Other traits. Physical, intellectual, and motor traits do not adequately differentiate delinquents from non-delinquents, although intelligence is more of a determining factor than either of the other two. Since delinquency is a form of social maladjustment we should try to account for it in terms of character. We may approach the problem from three directions; first, noting among delinquent adolescents those traits or qualities which seem especially significant; second, considering briefly the kinds of offenses committed; and

[1] Dougherty, "A Study of the Mechanical Ability of Delinquent Children of the Los Angeles Juvenile Court"; in *Journal of Delinquency*, vol. 10, pp. 293–311. See also the work of Aden (1926) and Jessup (1925).

third, seeking the direct causes of delinquency — the conditions which lead youths into conflict with the established moral and legal codes.

Love of adventure and excitement, impulsiveness, stubbornness, violent temper, egocentrism, revengefulness, social suggestibility, oversensitiveness, disrespect for authority, inability to plan new work or shape situations, mental vacuity and inanition which permit the ready entrance of bad influences, and other similar traits are often found among delinquents. Other traits also are found: capacity for leadership in some, its opposite in others, and varying intermediate amounts of it in others; generosity and kind-heartedness, selfishness and cruelty; slyness, cunning, and deceitfulness, brazen boldness and startling frankness. They have many traits in common with those who do not transgress the moral and civil laws.

Offenses of delinquents. Approximately 60 per cent of delinquent boys commit offenses against property (stealing, larceny, burglary), whereas the most common offenses of delinquent girls are immorality and incorrigibility, from 60 to 80 per cent of them being charged with these two offenses. Other offenses of boys are running away from home, truancy, and offenses against morals. Other common charges against delinquent girls are running away from home, stealing, and being out late nights.

Causes of delinquency. Common causes of delinquency are bad companions, bad home conditions, parental neglect or lack of parental control, adolescent instability and impulses, early sex experiences, mental conflicts, social suggestibility. Poverty seems not to be a determining factor, since the economic levels of the families from which delinquents come are distributed very much as for general population. Such bad home influences as excessive quarreling, immorality, and alcoholism, and homes broken by divorce,

desertion, or the death of one or both parents, are directly causative of delinquency, as we would expect.[1] Poor types of recreation, excessive street life, and school dissatisfaction are also causal factors.[2] Of less frequency are such factors as sudden impulse, habit of delinquency, ideation or mental imagery, vocational dissatisfaction, physical condition, and premature puberty.[3]

Table 35. Causes of Juvenile Delinquency in Chicago and Boston
(Healy and Bronner)

Bad companions	62.0 per cent*
Adolescent instability and impulses	18.0 per cent
Early sex experiences	12.5 per cent
Mental conflicts	6.5 per cent
Extreme social suggestibility	4.0 per cent
Love of adventure	2.5 per cent
Motion pictures	1.0 per cent

* Often more than one condition was causative.

Then, too, many unevaluated, intangible elements affect the ideals and behavior of adolescents. Not the least of these is the general atmosphere or standards of the community or neighborhood in respect to law-breaking and the general moral code.

Through his impulses, abundant energy, mental conflicts, ideals, associations, poor recreational facilities, lack

[1] Healy and Bronner found 7.6 per cent of their cases coming from good homes. By good homes they mean those in which there were no unfortunate conditions such as "poverty, great overcrowding or very insanitary surroundings, extreme parental neglect or extreme lack of parental control, obscenity, immorality, mother away working, or mentally diseased parent in the home."

[2] See also Miner, *Deficiency and Delinquency*; and Thurston, *Delinquency and Spare Time.*

[3] Healy and Bronner found no reason to believe that either nationality or number of delinquents in the family, or heredity ("apart from some otherwise significant physical or mental trait") was of any special causal significance.

of wise guidance and control, early experiences, and other similar conditions the young adolescent is led (or forced) into delinquency. His habits, ideals, and code of behavior bring him into conflict with authority. Much of this delinquency seems due to the lack of those decent, wholesome surroundings which many regard as the birthright of every child. Here, then, as elsewhere, an ounce of prevention is worth a pound of cure, because trying to reform juvenile offenders is usually unsuccessful with one half or more of them.[1]

We see, then, that delinquent adolescents as a group are not clearly distinguishable from the non-delinquent, either by physical status or by intellectual, mechanical, or motor ability, since the two groups overlap so much in these traits. Knowledge of such characteristics is essential to adequate understanding and wise guidance of individuals, but the personality of delinquents is not fully described in terms of physique, intelligence, and mechanical ability. The youth's lack of coördination and control of impulses and his abundant energy and vitality may get him in trouble, especially where inadequate provision is made for them. Environmental factors play an important rôle in causing delinquency, for civilization has greatly modified living conditions, but not child nature, so that the latter does not fit the former very well.

PROBLEMS FOR DISCUSSION

1. Discuss: "Adolescence is the age of immoralities and crimes."
2. Feeble-minded adolescents: their care, training, and supervision.
3. Adolescent indecision; extent and causes; home and school training suitable to overcome it.
4. Parental control as a cause of delinquency.
5. Adolescent day-dreaming, extent, dangers, and best means of control.

[1] See Chapter XVIII for a discussion of preventive measures.

6. Contrast the child's appreciation of the beautiful in nature and art with that of the adolescent.
7. Contrast negative and positive suggestion as methods of developing personality in adolescents. What types of incentives may legitimately be used?
8. How can outside agencies, such as parent-teacher associations, boys' clubs, etc., make themselves felt in high schools where there is a tendency for boys and girls to be delinquent?
9. Student activities to provide for experience as social leaders. Should student boards or councils have the penalty-giving power?
10. Adolescent inconsistency.
11. Intelligence as a handicap in developing effective, all-round personality.
12. To what extent is confidence in others a characteristic of adolescence? Upon what is it based, and in what respects is it different from that of childhood?
13. Contrast the interests of adolescents of superior, average, and subnormal intelligence. What differences are due to differences in environmental circumstances? To differences in intelligence?
14. The health of the superior student.
15. Participation of superior, average, and poor students in extra-curricular activities such as (1) athletics, and (2) French, science, or mathematics clubs.
16. The relative values of the traditional secondary school and of vocation for the intellectually duller adolescents.

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CHAPTER XIV

ADOLESCENT PERSONALITY AND ITS PROBLEMS

(*continued*)

WHAT is meant by the integration of personality traits? To what extent are they integrated at adolescence? What forces promote their effective integration and what ones hinder it? What is the "new self" which, according to many, emerges during the teens? What factors affect the development of adolescent personality? What are the laws, principles, or theories of development?

1. *The organization of traits at adolescence*

The meaning and significance of integration. What the individual is at any time and how effectively he can adapt himself to his surroundings, depend upon the traits he possesses and how they are organized. Development consists not only in the modification of traits but also in their integration. Both processes normally are taking place at the same time. Modification obviously means the strengthening or weakening of a function. Organization means the coördination and consolidation of traits into a larger functional unit of behavior, in which some constituents are subordinated to others which have greater functional significance in that behavior-pattern. Lack of proper organization often means that some one trait or a few of them are so prominent that they interfere with other more essential ones, or that they are too weak, or that they do not function together effectively. Thus, lack of tact may interfere seriously with capacity for leadership; or, to be more precise, we may say that tact is an element in capacity for leadership; and, in general, it seems that many traits listed as specific

elements of personality are themselves compounds of still more specific ones which together are a functional unit.

Illustrations of poor organization and wrong balance. Many illustrations of wrong balance and poor organization of functions are observed among adolescents. Two illustrative cases will be cited.

1. *G. S.* was in the second year of high school. He was well-developed physically, was in perfect health, had good diet and ample sleep, was strong, and had considerable athletic ability, especially in baseball and basketball. He was above the average in mental ability, and possessed many other desirable qualities — kindliness, sympathy, a generally cheerful disposition, and a willingness to help others. He did not make the baseball team or the basketball team, nor did he do good work in his studies. Yet at times he played a very fine game in either sport, excelling most of the boys who made the teams; but at other times he seemed so lazy and indifferent that his playing was atrociously poor. Sometimes he did very good work in school, being quite alert and interested, and putting forth much effort; but usually he was content to make little effort. The one trait lacking was regular persistence or durability. Often his failure seemed due to lack of persistence, to his inability to hold himself for any length of time to one activity; but at other times it appeared to be caused by sheer laziness.

Out of school George showed the same traits. Fishing and hunting and eating seemed to be the only activities in which he ever engaged with continued persistence. Whatever the cause of his trouble, he did not get much out of his four years in high school, although his teachers and the athletic coach did their best to get him to work regularly. He did not graduate from high school, having failed in several subjects. At eighteen this undesirable trait was more firmly fixed in his total make-up than it was at fourteen. Probably grim necessity alone will ever break it up. If he meets a situation which he can't avoid, and if he has to stick to a piece of work, he may reorganize his traits so that "taking his ease" is subordinated to its proper place; or some emotional disturbance over failure, loss of position, or other annoying event may jar him out of this customary mode of response, at least temporarily, giving him some new chance to modify the trait.

2. *Doris B.* also illustrates the effect of poor coördination of

functions upon the adolescent's personality. Her chief shortcoming was the great rôle conceit and jealousy played in her daily life. Doris was an attractive, normal, healthy girl, age fifteen and one half years, doing good work in Grade X. She was the spoiled only child of indulgent parents who tried to anticipate and provide for her every want or need, and almost succeeded — failing, however, to secure for her that happiness and content so essential to her peace of mind and mental health. She had an extremely exalted opinion of herself and her possessions, was quite jealous of other girls' popularity and seemed to feel that she too should be popular since she was (in her own opinion) so superior to them. She had dormant qualities of leadership, but had never learned to do things either for herself or for others.

Her elementary schooling had been under the instruction and coaching of tutors because her father's occupation for several years had kept the family constantly on the move. Her first year in public high school was very unpleasant, with the exception of the scholastic work which she enjoyed and did very creditably. She craved the companionship of girls at the same time that her conceit and snobbishness repelled their friendship. A teacher, whom Doris respected and admired, sensed her difficulties and through clear insight, sympathetic understanding, and wise direction helped her subordinate these undesirable qualities and give other traits an opportunity to develop. She did learn to get on with other girls and she became quite popular with them. At seventeen she seemed hardly the same girl as at fifteen. She did even better scholastic work in school, was a leader in many activities, and was very happy in the give and take of wholesome adolescent companionship. High school did much for her. Helping her to subordinate her undesirable qualities doubtless contributed more to her mental health and future happiness than did teaching her to master the various academic subjects of the high-school course.

Trait consistency an element in integration. While the organization of traits seems to consist largely in their relative strength, yet it also includes the establishment of such permanence or regularity of this relative strength as gives a certain consistency to conduct, and prevents any rapid shift from one quality to its opposite. A well-integrated personality shows a reasonably high degree of trait

consistence, or at least an absence of frequent alternations of contrary traits in essentially similar situations.

Adolescent inconsistency. The adolescent boy or girl usually does not possess that fixity and steadiness of character just mentioned. In many respects he has been well-habituated in routine, but many of his traits are not so stable because he is still immature. Herein lie the possibilities of his developing a better personality. He often shows many contradictory traits in confusing succession. He may be joyous and cheerful, unselfish, kind, or generous on one occasion, and be quite the reverse almost immediately thereafter. His conflicting impulses may show at times in inconsistent conduct responses. Of course the traits shown depend in part upon the situations evoking them, but even under essentially similar outer circumstances the youth may show widely divergent responses.

Parents and teachers need not be dismayed if the youth seems at times to be a veritable bundle of contradictions. Many impulses are pushing him along, some of these are contradictory, some (e.g., sex) are much stronger than ever before, and many of them have not yet been fully understood and placed in their proper relation to the others. As he revamps his outlook upon life during the teens, and has further wise guidance and control, he will come to inhibit some of the conflicting impulses and develop a more satisfactory, consistent working-basis for his powers.

Difficulty of forming generalized behavior-patterns. Yet learning is so specific that generalized behavior-patterns are difficult to form. Or, looking at this problem in another way, we see that situations, similar in some respects, differ in so many attendant conditions that we cannot be sure the similarity will be apprehended and be potent enough to outweigh the dissimilar elements and thus secure a particular response to many of them. There is evidence, both on ex-

perimental grounds and from certain *a priori* considerations of the nature of general intelligence, that generalizations of conduct-responses (i.e., generalization of applications) are best secured through broad training in which the desirable sort of behavior yields satisfaction and is made a conscious ideal; that is, by *specific training* in forming *generalized conduct responses.*

The relation of physical to motor abilities.[1] Physical and motor abilities are coördinated in varying degrees during the teens. Thus far no one trait or combination of traits has been found closely correlated with every other trait during adolescence. In fact, capacities of these sorts are in many ways quite specific. While some of them are closely associated, others are more loosely organized. Thus, weight and chest girth, strength of right and left arms, height and weight, and strength of back and grip have been found to bear a close relation to each other, the average correlations for both sexes at each age from twelve or thirteen to seventeen or eighteen ranging from .70 to nearly .90, and averaging about .80; but such a trait as breathing capacity correlates less than .50 with various strength tests. The correlations between some physical and motor tests may be as low as .20 or .30 at some one age during the teens, but usually their average is higher. Physical traits are not as closely related to each other among girls as they are among boys.

Changes in organization of physical and motor traits during the teens. Many of the adolescent's physical and motor abilities become more loosely organized as the later teens are reached. Growth and development are working differentially upon these various traits among different youths, and thus the traits are not as closely knit together at eighteen as at fourteen. We should note one or two exceptions to the general decrease in correlation of traits with the approach of

[1] See also Chapter VI.

maturity. The relation of weight to chest girth seems as close at the close of adolescence as at the beginning. Among boys strengths of right and left grip are probably just as closely coördinated at the later teen ages as at the earlier ones.

Strength and athletic skill of high-school boys. Various sorts of strength tests are more closely related to certain kinds of athletic skill of high-school boys than are height, weight, and chronological age. On *a priori* grounds this might be expected, since strength is such an important element in high-school athletics. Using as an index of athletic ability weighted scores in the 100-yard dash, high jump, broad jump, and bar vault, Rogers [1] found age, height, and weight, each correlating .50 or .51 with this athletic index for a large group of high-school boys, but lung capacity, right and left grip, back lift, leg lift, and pull-ups each correlated with it from .59 to .68. The best combination of age, height, and weight correlated but .62 with athletic ability, whereas a combination of the seven physical capacity tests gave a correlation [2] of .81. Weight, height, and age of a group of boys from Grades IX to XII correlated .82, .77, and .74, respectively with a strength index composed of the seven physical-capacity tests referred to previously. Weight seemed to be a much more potent determiner of strength than either height or age.

Such facts are not only of considerable theoretical interest on account of their giving knowledge of the organization of physical traits at adolescence, but they have practical value in the organization and administration of programs of competitive athletics in junior and senior high schools.

[1] *Physical Capacity Tests in the Administration of Physical Education*, pp. 13–15.

[2] Similar results were obtained when Rogers used an athletic index consisting of 100-yard dash, broad jump, high jump, shot-put, and accuracy in baseball and football throwing and in basketball goal shooting.

When bases of classification are sought in order to form groups approximately equal in athletic ability, physical-capacity tests will have to be considered since they are found to be more closely symptomatic of athletic ability than height, weight, or age.[1]

The integration of mental functions at adolescence. Psychologists have known for some time that desirable intellectual traits are positively correlated, and, accordingly, that the doctrine of compensation is not valid. Experimental evidence almost invariably indicates positive association between such functions, instead of the fairly high negative correlations which the doctrine presupposes. Generally we find a more closely knit organization between certain groups of traits than between others; in fact, some are very much alike, involve many similar constituent elements, whereas others are very loosely associated, the correlations, though positive, being low. Thus altitude of intellect, or the level (difficulty) at which intellectual tasks can be performed correlates very closely with width and area of intellect — with the number of tasks that can be done at any level of difficulty and, accordingly, with total area; [2] reasoning, judgment, and certain measures of attention also are closely associated.

On the other hand, the level at which tasks can be done (i.e., difficulty) is not nearly so closely related to speed of performance: [3] the rapid worker is likely, on the average, to do somewhat more difficult tasks; but the correlation of approximately .50 is too low to infer speed from ability (altitude or level) with a high degree of precision: in fact, estimating speed from altitude or *vice versa* would be in the long run nearly seven eighths as inaccurate as mere guessing.

Simple sensory capacities involving touch, hearing, vision,

[1] See also Chapter XVIII, section 3.

[2] Thorndike, *Measurement of Intelligence*, pp. 399–400.

[3] See Hunsicker, *A Study of the Relationship Between Rate and Ability.*

and the kinæsthetic sense are very loosely correlated, as are also the abilities measured by certain motor tests commonly used in the psychological laboratory. The integration of such traits with the more verbal ones also is very slight.

As a general proposition, the youth who does his mental work rapidly is also more accurate, but there are many exceptions. The old dictum, "slow but sure," is not the general rule, even though great importance is often attached to the notable cases in which a youth works slowly but with great accuracy.

Mechanical aptitude, as measured by the Stenquist assembly and picture tests, seems to have little in common with the traits involved in tying complicated knots, solving mechanical puzzles, drawing diagrams, or handwriting, the correlation usually being low, approximately .30 or less.

Compensation seldom shown in the organization of mental traits. Little evidence supporting the doctrine of compensation has been discovered in studying the organization of mental traits either at adolescence or at any other period. The good student in mathematics is generally a good student in history, Latin, science, etc., or is at least a potentially good student. Here, as before, there are exceptions. Special disabilities in the high-school subjects exist, but they are much less common than we often suppose. Many times the student forms a dislike for a subject on account of the poor quality of the instruction he has received in it, trouble with the teacher, or other similar environmental conditions, and will not try to master it.

For example, W. B. had very poor instruction in high-school mathematics and Latin. He also was under a constant strain from defective vision. He hated mathematics thoroughly, and Latin almost as much. His first examination in plane geometry netted a score of 22 per cent, which undoubtedly was all the test paper was worth because he

gave only a few definitions, and was unable either to demonstrate any proposition or to solve any original on the test. Home pressure kept him trying. He finally passed high-school mathematics after two or three reëxaminations to make up failures. He was a good student in science, history, and English. In college he was practically forced to take one year of mathematics. Fortunately, he was in a section of freshmen mathematics taught by the head of the department of mathematics — a man who knew both his subject and how to teach it. By the middle of the year W. began to like the subject and did good work in it. He elected two additional years of college mathematics.

The high-school student's lack of interest in a subject cannot safely be taken as conclusive evidence of lack of capacity for it; because, if it could, the correlation between interest and ability would be above .90. Investigation, however, shows lower relationships.[1] It is quite true that, when students do not have the ability necessary to master the materials of a subject, and the course in that subject is so organized that reasonably high standards of achievement are required, their lack of ability cuts off interest; but it is also true that other things may block interest, as we have just seen.

Loose organization of traits means that few of the conditions determining the amount of one function operate to produce the others.

The organization of many traits is more closely knit than is shown from using the imperfect means now available for measuring them, but, even after making generous allowance for such imperfections, we are reasonably sure of finding the association of mental traits varying from nearly perfect positive correlation between some of them to very low positive correlations between others.

[1] See Chapter X.

Educational achievement.[1] The high-school student who does good work in English, Latin, or mathematics is likely to do good work in history and science also, as we have just seen. The vast mass of data on this question indicates that achievement in the various high-school subjects is positively associated, the correlations often ranging from .40 up to .65 or .70, but sometimes being much lower. Drawing, physical education, music, manual training, and home economics usually are less closely related to the so-called academic subjects than the latter are to each other. Sometimes drawing correlates above .60 with science. In general, whatever causes tend to make a student do good work in one subject tend also to further his achievement in other subjects, and whatever leads him to do poor work in one subject tends also to lead him to do poor work in other subjects. Intelligence, the desire to excel, the habit of putting forth much effort on whatever tasks are at hand, and their opposites, may be mentioned. Whenever any of such factors affect students' work in some subjects, but not in others, they tend to lower the correlation between achievement in those affected and achievement in those not affected.

Knowledge of the factors affecting scholastic success in high school is of great value for predictive purposes — for the classification, promotion, and educational guidance of high-school students. This topic is discussed further in Chapter XVII.

Other traits. The adolescent has many very important personality traits which are not included under physique or intelligence. Many of these have been mentioned in section 1 of Chapter XIII. To what extent are these social

[1] Of the numerous investigations of the interrelation of achievement in the high-school studies, see Weglein, *The Correlation of Abilities of High-School Pupils.* See also the discussion of Prediction of Scholastic Success in High School and College, Chapter XVII, and the references at the end of that chapter.

and moral qualities integrated? Available data are not adequate for definite conclusions because they are derived by using rating scales which are lacking in validity, or reliability. We present, however, some of the best available evidence, remembering that the traits themselves are not real, persistent, functional units in the personalities of the adolescents, but are estimates of qualities, i.e., abstractions.

Among the students of one senior high school such traits as regularity (persistency), trustworthiness, self-confidence, initiative, coöperation, capacity for leadership, control of attention, and force of personality correlated .65 (see Table 36). According to this study,[1] force of personality is more closely akin to capacity for leadership, initiative, coöperation, quickness of thought, and self-confidence, and less closely related to regularity, respect for authority, and trustworthiness. Capacity for leadership is closely allied with force of personality, initiative, coöperation, and quickness of thought, but is much less closely associated with regularity, trustworthiness, and respect for authority. These last three traits correlate around .75 among themselves, but less than .50 with the former more dynamic traits like leadership, initiative, etc. A student's ratings were roughly alike from one year to the next, the correlations averaging around .60; the true correlations probably would be higher.

Hartshorne and May[2] devised certain behavior tests. Those for deceitful behavior correlated with each other, from −.004 to .543, averaging .37. Analysis of their data led them to conclude that deceitful conduct is highly specific; and that neither deceit nor honesty is a unified character trait; but that the amount of either depends upon the number of common elements in the situations rather than

[1] Hughes, "General Principles and Results of Rating Trait Characteristics"; in *Journal of Educational Method*, vol. 4, pp. 421–31.

[2] *Studies in Deceit*, Book II, p. 212.

TABLE 36. INTERCORRELATIONS OF ESTIMATED PERSONALITY TRAITS OF 450 HIGH-SCHOOL SENIORS
(Hughes)

	Trustworthiness	Sense of accuracy	Self-confidence	Initiative-aggressiveness	Respect for authority	Coöperation	Force of personality	Capacity for leadership	Quickness of thought	Control of attention	Retentiveness of memory
Regularity-persistency	.79	.75	.49	.55	.72	.63	.49	.41	.64	.75	.71
Trustworthiness		.79	.47	.56	.77	.68	.55	.46	.64	.77	.69
Sense of accuracy			.64	.66	.67	.69	.61	.56	.79	.78	.79
Self-confidence				.80	.42	.59	.70	.68	.74	.58	.67
Initiative-aggressiveness					.53	.72	.77	.78	.77	.67	.72
Respect for authority						.71	.52	.44	.53	.70	.63
Coöperation							.74	.73	.67	.67	.68
Force of personality								.83	.74	.66	.65
Capacity for leadership									.70	.60	.60
Quickness of thought										.77	.82
Control of attention											.82

upon a common bond of deceit or of honesty in the individual. Accordingly, other character traits probably are loosely organized.

Emotional stability. Emotional stability is an important element in personality, and when seriously lacking is a cause of mental ill-health. We do not know, however, the extent to which it is related to other traits which might be grouped under physical, educational, intellectual, or social maturity, although certain considerations lead us to believe that the relationship is not close. Our own data (Table 37) show that the number of unfavorable responses on the Mathews-Woodworth personal-data questionnaire has no significant relation to these other forms of maturity; but we should re-

peat again that we question the validity of this questionnaire as a measure of emotional stability (see also p. 234).

TABLE 37. INTERRELATIONS OF EMOTIONAL STABILITY, AGE, INTELLIGENCE, EDUCATIONAL STATUS, HEIGHT, AND WEIGHT OF THIRD-YEAR JUNIOR-HIGH-SCHOOL PUPILS

(Brooks)

Boys (N = 107)	CHRON. AGE	HEIGHT	WEIGHT	MENTAL AGE	AVE. MARKS GRADE IX
Emotional stability*	.139	.006	.264	−.202	.016
Chronological age		.107	.193	−.402	−.440
Height			.534	.123	.173
Weight				−.032	.033
Mental age					.467

Girls (N = 118)	CHRON. AGE	HEIGHT	WEIGHT	MENTAL AGE	AVE. MARKS GRADE IX
Emotional stability*	.070	−.053	−.210	−.218	−.132
Chronological age		.230	.319	−.294	−.408
Height			.387	−.140	.003
Weight				.002	−.202
Mental age					.497

* As measured by the Mathews-Woodworth personal-data questionnaire.

The interrelation of physical, mental, educational, social, and moral abilities at adolescence. We have already seen (Chapter VI) that physical status has little in common with educational and mental maturity; that, on the whole the mentally abler groups average somewhat above the less able ones in physical qualities, but that the differences are too slight to have any value for prophesying physical status

from mental or educational maturity, and *vice versa*. We have also seen (Chapter XIII) that marked physical underdevelopment, and, especially in the case of girls, marked overdevelopment are sometimes contributory causes of adolescent delinquency.

Marked deviations from normal physical status also influence adolescent personality. The overgrown boy is not only awkward physically, but his size and clumsiness make him quite self-conscious and ill at ease in many of his social contacts. He often slouches down when seated, often stoops when standing, as if to render his excessive size less noticeable. He generally gets used to his size and it does not bother him in his social adjustments, although excessive weight or height may sometimes continue to embarrass him on into manhood or womanhood. Youths who are very short often suffer too from a consciousness of their deficiencies. Other things being equal, adolescents who deviate markedly from the norms in physical traits develop force of personality and leadership at greater effort than those whose physical status does not thus set them off from their fellows.

It is also obvious that physical condition or health is a factor in personality, especially in such traits as leadership, initiative, and force of personality. The youth who is in poor health is seriously, although not completely, handicapped in developing strength of personality and certain moral traits. Good physical condition is a *sine qua non* for the most effective personality, since it provides the essential energy and vitality. Nevertheless, individuals in poor health often do have strong personalities, but their ill-health or poor physical condition is a handicap rather than a help.[1]

[1] We are not considering those cases in which great strength of character was developed in the process of achieving success under the handicap of physical defects, although it might be urged with some degree of plausibility that, without the handicap, the same intense effort would have led to corresponding development of character.

With normal physical development adolescent personality appears to be largely conditioned by other sorts of qualities; but, with large deviations from the average, physical qualities assume greater significance. Mental health plays a very important rôle in adolescent personality, as we shall see in Chapters XV and XVI.

The rôle of intelligence in personality. Intelligence plays an important part in the social and moral development of the adolescent, but it is quite obvious that intelligence alone is no guarantee of a well-developed, well-rounded personality. Intellectual training, valuable as it is, does not *per se* guarantee or even necessarily greatly promote the moral growth of youth in the teens. His intellectual training may have little effect upon his moral qualities; but it is equally true that a certain amount of intelligence and intellectual training are necessary to moral development. Many complex situations have to be analyzed to know what is for the social good. The intellectual development of youth during the teens necessitates modification of the guidance and control which were suited to his childhood, if moral growth is to be furthered. *Moral* and *intellectual* are different, even though somewhat related. Educational procedures which forward the one should be chosen so as to aid the other whenever possible.

Even though it be admitted, as some lovers of mathematics maintain, that love of truth may, under certain circumstances, be generated from the study of mathematics, yet we see no reason for believing that this love of truth will become generalized and be a conscious ideal governing the adolescent's everyday dealings with others; at least, the facts and principles of the psychology of learning indicate that the most effective way of training him to be truthful in his dealings with others is not to teach him mathematics (however desirable this may be for other reasons), but rather to pro-

vide a wealth of concrete experiences under such conditions that satisfaction follows his dealing truthfully and a generalization or ideal of dealing truthfully is built up.

According to one study [1] of junior and senior high-school students, intelligence correlated from .17 to .42 with the ratings on various traits assigned each pupil by five or six teachers (see Table 38).

Table 38. Relation of Intelligence to Certain Personality Traits of High-School Students

(Hughes)

N = 1030

Quickness of thought	.42
Retentiveness of memory	.40
Force of personality	.37
Initiative-aggressiveness	.36
Control of attention	.34
Capacity for leadership	.33
Self-confidence	.33
Sense of accuracy	.32
Coöperation	.27
Regularity-persistency	.26
Trustworthiness	.22
Respect for authority	.17

Intelligence appears to be more of a factor in some traits than it is in others. For such important moral qualities as coöperation, regularity-persistence, trustworthiness, and respect for authority it is a less significant element than it is for initiative, force of personality, retentiveness of memory, and quickness of thought. These results are in accord with wide observation, and are supported by certain important *a priori* considerations. It is, accordingly, very significant for moral-social training that such valuable traits can be developed among adolescents whose intellectual abilities are at or below the average.[2]

[1] Hughes, *Journal of Educational Psychology*, vol. 17, pp. 482–94.

[2] We must recall, however, that these correlations are based upon adolescents whose I.Q.'s are above 75.

Space does not allow an adequate presentation of all the relevant data on the organization of adolescent personality traits. We have presented enough, however, to show that integration is not a fixed, unvarying condition of the adolescent under different circumstances, nor is it the same for all adolescents. We should, accordingly, consider briefly how traits become organized. The general principles of their integration are the same at adolescence as before and after.

How personality traits become integrated. Curiously enough, personality traits become integrated very largely by the experiences through which they are developed and by the ideals and purposes dominating the individual as he develops. We have seen (Chapter XII) that personality develops through the modification of inherited psycho-physiological elements (instincts, emotions, etc.) by environmental conditions and probably by inner growth. We also have seen that the individual's purposes and ideals, developing through the wider experiences of increasing age, are selective factors determining which responses satisfy and which annoy. By the dawn of puberty the child has built up many small reaction systems.

The actual conditions under which traits are evoked tend to organize them into small functional units — units respondent to situations similar to previously occurring ones. These small functional units are very narrow and specific at first, and, as a matter of fact, may remain so. Any particular element of environment (or inner condition of the organism) which evoked and helped build up this small response unit appears in combination with many other diverse elements. Accordingly, more experience tends to increase the range of application of these small functional wholes, and they tend to become parts of larger units of response, especially as the individual through his purposes, reflection, and

generalization sees a common or more general element in the otherwise diverse, unrelated situations.

The adult never completely unifies all his response-systems. Under the best circumstances he also retains a certain flexibility which facilitates the formation of new habits, the modification of old ones, and needed changes in their integration. The adolescent has attained even less integration of functional units than the adult. His personality is really a group of functional systems, some large, some small, some closely tied together, others very loosely connected, which operate with varying degress of consistency under varying conditions, as we have seen. High ideals of conduct, effectively formed, are a unifying force and insure greater consistency of conduct responses.

The critical questioning attitude, so much stronger at adolescence than ever before, enables the youth to make more significant evaluations of experience and, under suitable conditions, may lead him to a more appropriate coördination of functions. One notable characteristic of adolescence is the building-up of larger units of response, both by consolidating smaller ones into larger wholes and by directly extending the range of application of the smaller units.

Impulses and desires as integrating forces. Impulses and desires are important elements in the integration of personality, being closely related to instincts, emotions, habits, and ideas. The increased strength of the sex impulse at adolescence may be a disintegrating force unless by its sublimation the youth is enabled to coördinate it properly with his other traits. Conflict of desires is a common cause of disturbances of personality. Thwartings and conflicts also are the common lot of all; yet the vast majority of adolescents suffer no serious personality disturbances thereby. They show considerable consistency in important traits and attain a unity in their organization in respect to

life's most engrossing activities. Many times, however, the strain upon mental health is needlessly great, as we shall see in the following chapter.

2. *The new self*

The idea of a new self at adolescence. We are now in position to discuss more adequately the widespread, popular view that during adolescence a "new self" is born, that sometime during the teens the youth breaks with his past and emerges a new person. This belief is found among primitive peoples who think the youth is a different being after some critical part of the pubic rites has been performed — e.g., after he has been unconscious or feigned death at a certain place in them. This naïve view is held by many of us moderns as well. Its attractiveness and plausibility tend, however, to disappear as closer study is made of the total personality (or of specific traits) of the same youths at different pre-adolescent and adolescent ages. Those who believe that the birth of a new self is one of the chief characteristics of adolescence face the difficult task of harmonizing such a belief with the results of scientific observation and measurement.

Evidence from the correlation of traits. The high positive correlations between physical status at different ages indicate that the relatively tall, heavy, or strong youth at ten, twelve, or fourteen will be relatively tall, heavy, or strong, respectively, after an interval of one to six years; that is, if we measure the height, weight, strength, etc., of a group of boys or girls twelve years of age, and remeasure the same ones a year, two years, or even six years later, we will find that those who were above the average of the group in some trait the first time are likely to be above the average in that trait the second time we measure them; that those near the average in these traits the first time will be near the average

the later time; and that those below the average one time will tend to be below the average the next time. If we rank each individual of the group in each of these physical traits at twelve, and again from one to six years later, we will find that an individual's two ranks in each trait will tend to be nearly the same. They will not be identical because that would mean a correlation of 1.00, whereas the obtained correlations usually range from .60 to above .90.

The high positive correlations between specific or composite mental traits at different ages also indicate a continuity of mental development not at all in accord with the "new-self" doctrine, as do also the fairly high correlations obtained between achievement from year to year when highly valid and reliable measurements of educational achievement are used.

Evidence from growth curves. Another line of evidence, more valuable than the correlations between traits after an interval of a year or more, is derived from individual growth curves. A study of many such curves gives little indication of any remarkable saltation at adolescence. The curves tend to be regular.[1]

If we apply the doctrine to specific instances, many aspects of it really break down. The dullard at twelve is not the genius at sixteen, nor is the poor student at twelve likely to be a top-notch scholar a year or more later, unless the cause of his poor scholarship in the first instance is the kind of training he has had, the amount of effort he put forth, or some other similar condition. If environmental factors account for his being a poor student, changes in them may make him a better student, but if his poor scholarship is

[1] Any study of growth curves must take account of the validity and reliability of the data upon which they are based. Inadequate measurement tends *per se* to yield irregular curves, as we have pointed out previously. (See Brooks, *Changes in Mental Traits with Age,* pages 58–62.)

due to lack of innate ability, he will, of course, continue to do an inferior grade of school work.

No new traits observed at adolescence. Further evidence against this doctrine is that no new traits make their appearance during the teens. Any trait observed during adolescence may also be seen before this period begins. Even sex manifests itself before maturation, as genetic psychology has shown — although its pre-adolescent manifestations are not characterized by the strong impulses which are present during adolescence.

Evidence from other important considerations. What the youth is at twelve or thirteen is the product of the interaction of the two great forces — heredity and environment. We have repeatedly noted that the youth's personality includes a great many habits more or less firmly fixed. These are likely to persist and continue to form an important element of his total make-up, unless modified by one or both of these two forces.

An inherent assumption of the "new-self" doctrine is that adolescence *per se* breaks up or intrinsically modifies these habits, or introduces so many new ones that the old ones become a relatively very insignificant part of the youth in later adolescence. If this be true, then during the period of maturing either heredity or environment, or both together, produce the abrupt changes implied by the doctrine. Careful observation and tabulation of *changes* taking place in environment at the teen-age period indicate that they would not have the influence necessary to affect habits to such an extent. Knowing the part that training plays in building up habits, we do not see how heredity, or the innate developmental forces of the youth, can produce such cataclysmic changes as the doctrine implies. Surely mere maturing does not modify the child's language habits to the extent that he suddenly begins to speak and write correctly; nor does

it modify his spelling and number habits so that originality in spelling and faulty computation and poor reasoning in arithmetic are abruptly displaced by the effective modes of response. And similarly, in the case of many other traits. Maturation does not *per se* break up such habits as deceitfulness, dishonesty, disrespect for authority, and carelessness, even though the adolescent boy who becomes interested in some one of the opposite sex may show much more concern about his personal appearance. Yet these habits are part of the youth's personality. Any one can readily prepare a long list of habits covering a wide range of situations and can see that many of them are not suddenly broken up at adolescence. Such a list would include many traits which are usually classed as moral.

While we do not have such precise means of determining the changes in emotional, volitional, and other dynamic personality traits, yet there seems to be little reason for believing that the integration of the youth's habits, drives, and tendencies is independent of his own past. Recent work in genetic psychology has shown that relatively permanent behavior patterns are formed very early. Modification becomes increasingly difficult as first, infancy, and then childhood are passed. Changes occur during adolescence, and they are very significant, especially those relating to maturation, but, with few exceptions, they seem to be largely a continuous modification rather than an abrupt transition.

Maturation a time of changes. This appears to be what happens: Changes do take place during the time of maturation. Some of them accentuate the differences between children and adults, whereas superficial observation greatly magnifies others. Accordingly, the changes in some traits are greatly emphasized and their magnitude exaggerated, at the same time that the slow, almost imperceptible modification of many other very important ones is overlooked.

Add to this the uncritical tendency to generalize from a few striking instances, and the reasons appear why so many believe in the birth of a new self at adolescence.

Since personality embraces all the traits of the youth, a proper view of its development during the teens must be based upon the total organization of traits, rather than upon undue emphasis upon a few of them and the neglect of other equally important ones. The self that emerges at the close of adolescence is, of course, vastly different from the one at the beginning of maturation because development means changes; and to the extent that the doctrine of the birth of a new self emphasizes these changes it is of value. The self at the close of the teens, though, is also quite similar to the one at their beginning—a self whose present roots lie deeply imbedded in his past. By underemphasizing this continuity and by neglecting the present potency of the youth's past, the new-self doctrine becomes pernicious, giving an incorrect account of adolescent development.

To the extent that careful observation, accurate measurement, and critical interpretation of data replace superficial observation, inadequate measurement, and impressionistic interpretations, to this extent does continuity seem to be the law of adolescent development.

3. *Factors in the development of personality during adolescence*

Many factors common to childhood and adolescence. Changes in adolescent personality are brought about by the same kinds of influences as were at work during childhood, but the relative strength of various factors is altered. Sex, gregariousness, and social approval and disapproval, for example, have greater force than before.

One of the most important set of factors affecting the youth's development during the teens is his personality at

the beginning of puberty — his knowledge, habits, ideals, impulses, etc. He enters adolescence with many useful ways of responding to a wide variety of intellectual, social, and moral situations, and with some useless or harmful ways. The relative proportions of these two kinds of response systems determine in part the difficulties he will meet in attaining an effective personality.

His own mental growth during the teens, changes in instinctive and emotional tendencies, physical growth, and sexual maturing are also important factors. Ideas and principles leave their impress upon him, as do also contacts with other persons and with complex social situations, with group customs and opinions, with moral and religious training, and with the thousand other things constituting his environment.

Needs of the adolescent. Many of these factors are incidental, others are planned. The youth still needs guidance and control, and needs habituation to fix modes of response. Control involves restraint at times, but it should be positive as much as possible, consisting in the direction of his activities. He needs freedom; more, in fact, than he has ever had before, but the amount should be proportionate to his capacity to use it wisely or at least without serious harm to himself and others. Initiative, self-reliance, self-confidence, leadership, and force of personality, are important traits. Their development should go hand in hand with the development of unselfish or social motives of conduct.

Every adolescent is entitled to form the habit of being industrious, of working hard at something useful. Whether he goes to school or enters industry, he needs to have work suited to his capacity, which he can perform with reasonably hard persistent effort. Having something to do which requires intense effort is a developmental factor whose full value very often is not realized. As we shall see in Chapter XVI,

work is one of the fundamental conditions of mental health.

The adolescent is also entitled to wholesome, vigorous, engrossing recreational activities, both as preparation for the use of leisure time, but more particularly for their immediate socializing and recreational values.

4. *Theories of development*

In their endeavors to interpret observed facts of human development men have formulated certain theories and doctrines, which we shall now examine briefly. Three of the theories postulate a relationship between individual (ontogenetic) and racial (phylogenetic) development.

The Recapitulation Theory.[1] The Recapitulation Theory is given many meanings by different people. In general, it states that the individual, in his development, passes through the same stages (but in abbreviated form) that the race has passed through in its development. It embraces three different aspects, which frequently are confused by its adherents. Haeckel's statement that "ontogeny recapitulates phylogeny" has been hailed as a biogenetic or bionomic law; has been naïvely and uncritically accepted by many; has been applied to the arrangement of courses of study on the "culture-epochs" basis; and has exerted much influence upon the discipline and control of children. Yet, as we shall see presently, there never has been sufficient reason for calling it a law of development, because the best evidence indicates that the theory, as set forth by its proponents, is false.

[1] One might suppose that this theory was no longer given serious acceptance by students of human nature if he were not made painfully conscious of the contrary fact by contact with the actual views of college and university students and high-school teachers and principals. The theory still has considerable hold upon the popular mind, and is stoutly defended by many mature students, largely upon the grounds set forth by its enthusiastic proponents nearly a generation ago.

The proponents of the theory have called attention to certain parallels between individual and racial development. Briefly,[1] the three aspects or forms of the theory are as follows:

1. The human embryo in its development passes through the same stages as the race did in its evolution from simpler forms of life. Vestigial organs and other anomalies of development among infants at birth are cited as evidence, as are also certain resemblances of the human embryo to the embryos of lower forms of animals.

2. The child must repeat "the typical activities of adults" of the earlier and simpler forms of life which presumably were his remote ancestors; (2) is supposed to follow logically from (1).

3. The child in his development repeats human history, being a savage at one stage, semi-civilized at a later one, and finally reaching the stage of modern civilized life.

Burk's [2] statement may be taken as a sample of the views of the adherents to this theory. He says, "The individual, from conception to senescence, follows the order of development of the race."

Some important evidence. Let us examine the evidence bearing on these three statements.

1. *Does human embryology give support to the view that ontogeny repeats phylogeny?* For an answer let us turn to those best qualified to give an authoritative reply — the embryologists, and the comparative and physiological anatomists.

[1] For more extended discussion, see Thorndike, *Educational Psychology*, vol. I, chaps. 16 and 17 (or *Educational Psychology, Briefer Course*, chap. 8); Hall, *Adolescence*, vol. I, chaps. 1 and 2; and the references in section (3) at the end of this chapter. Thorndike attacks the theory; Hall was its best-known advocate.

[2] *Pedagogical Seminary*, vol. 6, p. 36.

Keith [1] says:

The pioneers of Embryology began in the hope of discovering the stages in the evolution of the human body by an accurate study of its development. It was expected that the ovum, as it became transformed into the embryo, and the embryo as it changed into the fœtus, would recapitulate man's evolutionary history. *From what has been related* in the two previous chapters *it is plain that we see no resemblance between the successive stages of the human embryo and the succession of types which compose the scale of the Animal Kingdom.*[2] Those who expected the law of recapitulation to hold true in all its details forget that the human embryo is radically modified in order that the first nine months of development may be spent parasitically in the womb of the mother. The storage of the yolk in the ovum, the precocious development of trophoblast, chorion, amnion and allantois, have transformed the orderly manifestation of evolutionary stages. Yet to a certain degree the law remains true; the human body begins as a single cell, similar in construction to the simplest form of animal life — a protozoön; it becomes a globular cluster of cells in its morula stage, similar to the simple forms of multicellular organisms. Further, there are numerous features seen during the development of the embryo which can only be explained by supposing that the human body, in the course of its evolution, has passed through those stages which we see represented in simpler invertebrate forms — such as the Hydra and the worm.

We should note that the parallelism between racial development and that of the human embryo consists chiefly of the following: (1) the human body begins as a single cell, which (2) becomes a globular cluster of cells, and (3) the embryo shows in its development numerous features "*which can only be explained by supposing that the human body, in the course of its evolution, has passed through those stages which we see represented in simpler invertebrate forms — such as the Hydra and the worm.*"

[1] Sir Arthur Keith (Hunterian Professor Royal College of Surgeons, England; Fullerian Professor of Comparative Anatomy, Royal Institution, London) in his *Human Embryology and Morphology*, p. 35.

[2] Italics ours.

Lewis [1] says:

From the imaginary comparative anatomists, imbued with the doctrine of the segmentation theory, we have inherited a bulky literature, gradually passing into oblivion, on the segments of an unsegmented skull.

Referring to embryo No. 460, Carnegie Collection, he says further:

Who would claim that our primitive ancestors had more brains than skull? . . . And yet in this embryo the brain is enormous in size as compared with the cartilaginous skull or "primordial cranium." Even with the maximum development of the cartilaginous skull the conditions are essentially the same.

Comparative anatomy shows that in lower mammals and vertebrates the skull is relatively large as compared with the brain, while human ontogeny shows exactly the reverse. *The whole assumption that ontogeny repeats phylogeny was based upon the erroneous notions concerning evolution that were prevalent before the present-day conceptions of the germ-plasm were introduced.*[2] If the various steps in evolution have come about primarily thru the modification of the germ-plasm, then we would expect changes to appear in the egg and in the subsequent stages of ontogeny, and the entire development would thus be modified as much as the adult. *There undoubtedly are fleeting indications of our primitive ancestors in the development of the embryo, but they are not very numerous and are usually extremely difficult of interpretation.*

It is probable that in the phylogenetic history some sort of a membraneous skull preceded the cartilaginous skull, as the latter preceded the osseous; but it is apparent from recent studies on vertebrate cartilaginous skulls that they no more form a phylogenetic series than do the adult skulls of the same species. The series of cartilaginous human skulls with which we are now familiar, modeled from embryos varying in length from 13 to 80 mm.,[3] has failed to add much or any additional phylogenetic evidence regarding the form of the skulls of our remote ancestors. In fact, these

[1] W. H. Lewis (Professor of Physiological Anatomy, Johns Hopkins University) in *Contributions to Embryology*, vol. 9, no. 39, pp. 301–02.

[2] Italics ours.

[3] That is, from one half an inch to 3.1 inches.

cartilaginous skulls are as characteristically human as the adult skull is human. *It is becoming more and more clear, as our knowledge of the anatomy of the human embryo increases, that both it and its various organs are at all stages as characteristically human as are the adult body and its organs.* One can distinguish with ease between the cartilaginous skull of man and that of the ape, the pig, the cat, the rabbit, or the mole, as each is as characteristically formed as are the adult skulls of the same species.

"Fleeting indications of our primitive ancestors" and, in the case of human embryos four fifths of an inch in length, a "brain enormous in size as compared with the cartilaginous skull or 'primordial cranium'" are evidence which should make students of human nature as careful about asserting developmental parallels as are the embryologists whose researches are contributing to our knowledge of this important study.

Even if the extreme form of the theory were true, the recapitulation would be completed before birth and would not have to be repeated during post-natal development.

2. *Does or must the child repeat typical activities of adults of earlier forms of life?* We hope not.

3. *Does or must the child repeat human history?* Here, too, we hope he may, through wise guidance and control, be spared many of the costly blunders recounted in the history of the race.

Stern seems to believe in both (2) and (3). In his *Person und Sache* [1] he notes the following parallels:

1. During the first month the child is a "suckling whose lower senses preponderate." Existence is "dull instinctive and reflexive," on the mammalian level.

2. During the second half-year his development is like that of the ape. He has learned to grasp objects and is versatile in imitation.

3. During the second year he becomes a man, attaining an upright posture and learning to talk.

[1] Pages 299–300. Also quoted by Koffka in *The Growth of the Mind*, p. 42.

4. The next five years of play and dream life are "at the level of primitive peoples."

5. The school years bring "closer articulation with the social group," as well as definite obligations and a clear distinction between work and play, and are an "ontogenetic parallel to the introduction of man into a civilized state with its political and economic organization." Stern holds that the things most adequate to the youthful mind during the first years of school are the "simple situations of antiquity and the Old Testament"; that the middle years of school "bring with them the enthusiastic features of Christian civilization"; and that puberty is characterized by the "mental differentiation which corresponds to present-day civilization," and is, in fact, an "Age of Enlightenment" for the individual.

We see nothing to support such a fancied parallelism. Thorndike's classic selection of quotations from Hall, tending to show how individual development parallels the fish stage in the race, is as follows: [1]

A babe a few days old . . . made peculiar paddling or swimming movements. . . .

In children and adults . . . we find swaying from side to side or forward and backward, not infrequent. This suggests the slow oscillatory movements used by fish. . . .

Children . . . after the first shock and fright take the greatest delight in water. . . .

Others older or less active can sit by the hour seeing and hearing movement of water in sea or stream.

Thorndike's [2] comment is:

The fish stage is thus paralleled all the way from four days to forty years, even if we doubt the existence in fishes of anything like the elderly contemplation of water by one sitting on the bank.

Unbiased, critical study of the data derived from careful observation of children at various ages gives no evidence supporting the second and third aspects of the theory. There

[1] Hall, G. Stanley, *Adolescence*, vol. II, pp. 192–95.

[2] *Op. cit.*, vol. I, pp. 256–57. Cf. also Norsworthy and Whitley, *Psychology of Childhood*, p. 37.

seem to be no grounds either for believing that the child must or should repeat human history or the adult activities of earlier forms of life, or for expecting that he actually will repeat them. The theory has no value for the two practical and scientifically important problems of predicting and controlling behavior of younger children and adolescents. Knowledge adequate for these two problems is best sought not through application of dubious parallels, but by careful, extended observation of children and adolescents, and the measurement and analysis of their traits over a sufficiently long period of time to find the elements of value for prediction and control and to determine their true worth. We will obtain a vastly better knowledge of adolescent boys and girls by observing them and studying their behavior to find out their interests, impulses, and desires than by reading the fullest possible account of the history of civilization, or by any amount of analogies to the racial or historic past.

The Utility Theory. A second theory, offered by Thorndike [1] to explain the order of development of the individual's innate tendencies, is known as the Utility Theory. According to it *variation* and *selection* are the two factors which account for both the order of appearance of innate tendencies and their existence as well. The amount of evidence supporting the theory is not sufficient to warrant its unqualified acceptance. Some facts and certain *a priori* considerations suggest its validity — for example, the following: When the order in which delayed tendencies appear in the child is different from the order in which they appeared in the race, the former seems to be the useful order. Walking erect precedes climbing trees, but in the race the order was the reverse. Sex also appears in a different relative time order.

The Correspondence Theory. The Theory of Correspondence, as set forth by Koffka, assumes a relation be-

[1] *Op. cit.*, vol. I, chap. 16.

tween individual and racial development, but does not state what the relation is. Koffka [1] says:

> Dispositional traits are so constituted that the individual indicates the history of his development from the most primitive beginnings by typical forms of reaction to his environment which appear at every stage in his career; and these reactions correspond in a general way to the stages of racial development. There are, therefore, primitive, more highly developed, and very highly developed forms of reaction each of a uniform type, whether they be found in ontogenesis or in phylogenesis.

As a matter of fact, we cannot be sure what theory of development really *does* fit the facts. We have abundant evidence that the Recapitulation Theory *does not*, but we need to know a vast deal more about human development before we can postulate a theory that does. We are inclined to agree with Hollingworth's [2] view that the individual develops as he does, not *because* the race developed that way, but "*for the same reason* that the race or institution did, namely, because of the limitations of skill, intelligence, and knowledge."

Other allied doctrines; nature's infallibility. A clear statement of the doctrine of nature's infallibility by one of its proponents [3] is as follows:

> Since it is the order of nature that the new organism should pass through certain developmental stages, it behooves us to study nature's plan, and to seek rather to aid than to thwart it. For nature must be right; there is no higher criterion.

The doctrine that nature is infallible need not be given extended consideration, despite the fact that much popular writing on child-training tacitly assumes its validity. Just a little knowledge of innate tendencies is needed to make one

[1] *The Growth of the Mind*, p. 47.

[2] *Mental Growth and Decline*, p. 213.

[3] Guillet, *Pedagogical Seminary*, vol. 7, p. 427.

question the doctrine. To exhortations that we train the child according to his nature, we might well ask, "Which nature?", for it is obvious that the child possesses many tendencies, many impulses, many developmental possibilities which are not desirable in modern civilized life. By our inborn nature we fear some sudden loud noise or unusual flash of light, but we acquire our fear of yellow fever or polluted water. We have already seen, too, that the individual's impulses and desires do conflict so that all of them cannot be satisfied.

Of course, education and training should develop a child according to his nature — in fact, it is difficult to see how it could be otherwise; but the objectives of education require for their attainment the redirection of some inborn tendencies, the elimination of others, and the development and consolidation of others into habits. This is to be expected, because the youth's original nature comes from the past, is more or less archaic, and is, in fact, a sort of *vis a tergo*. We are heartily in accord with Thorndike's view that man's original tendencies "have not been right, are not right, and probably never will be right; and that the one thing unreservedly good in his nature is the power to make it better."

Catharsis. Another doctrine, closely allied to that of nature's infallibility, is that early wrong-doing *per se* immunizes against later wrong-doing. According to Hall, "Rudimentary organs of the soul now suppressed, perverted, or delayed . . . crop out in menacing forms later"; they should be developed at their proper time "so that we should be immune to them in maturer years." He says,[1] "It seems a law of psychic development, that more or less evil must be done to unloose the higher powers of constraint and to practice them until they can keep down the baser instincts."

[1] Hall, *Adolescence*, vol. II, p. 83; see also *ibid*, Preface, p. x.

It may be true that certain undesirable tendencies are prerequisite to certain desirable ones,[1] or that they may be the necessary associates or results of desirable ones. Doubtless there are activities which in and of themselves are more or less undesirable but lead on to desirable ones. The belief in catharsis, however — in the immunizing effect of early indulgences — seems to have little supporting evidence. Exercise of a function, or repeating a response, does not *per se* weaken the connection between that situation and that response. If the results of making an undesirable response are annoying, then we would expect that response to be eliminated. This, however, is not catharsis; it is that important law of learning — the law of effect — which we discussed in Chapter IX. Wise direction and control imply that arrangement of conditions by which undesirable responses are annoying to those making them.

Saltation. From the data presented on mental, physical, and other kinds of development there seems to be little reason for believing in any sudden great spurt at adolescence. Growth and development seem, on the whole, to be generally regular during the teens, with individual exceptions as previously noted.

Laws and principles applicable for developing adolescent personality. If the Recapitulation Theory is not true; if the Utility Theory is still unverified; if the Correspondence Theory is too indefinite; and if the doctrines of nature's infallibility, of saltatory development, and of the immunizing effect of early wrong-doing have little basis in fact; then what laws and principles really are applicable? What ones are useful in effecting desired changes in personality?

It is obvious that the fundamental laws governing the modification of traits are the same at adolescence as before or after; they are simply the laws of learning — exercise

[1] See, for example, Burk, *op. cit.*, p. 24.

or repetition, and effect (the potency of satisfaction and annoyance, respectively, in strengthening and weakening connections between situation and response) — and the principles of economy in learning. The youth's purposes (ideals, motives, mind-set) largely determine which response shall satisfy and which annoy, as we have already seen.

Some traits are to be inhibited or modified, others strengthened. Inhibition and modification are secured by arranging conditions so that the youth either: (1) has no occasion to make undesirable responses, or (2) experiences unpleasant results if he does, or (3) is so engrossed with making desirable responses that through substitution they replace the undesirable ones (including, of course, sublimation). As a general proposition, substituting desirable for undesirable responses is obviously of more value than disuse or punishment. To strengthen a trait the corresponding, contrary procedures are used.

PROBLEMS FOR DISCUSSION

1. The effect of fear or worry on the organization of an adolescent's personality traits.
2. Relation of character traits to success in school; to vocational success.
3. Relation of mental ability to moral character. Which mental and moral traits are closely interrelated? Which ones loosely interrelated?
4. Show in detail how the over-potency of some environmental condition has had a bad effect upon an adolescent's personality.
5. The rôles of environment and heredity in the organization of traits of adolescents.
6. Discuss: If two traits are closely integrated, then they have many constituent elements in common.
7. Discuss: Two closely integrated traits may have few constituent elements in common, their close relationship being built up as are conditioned responses.

8. Give additional evidence against the "new-self" doctrine. What other evidence supporting it do you find?
9. Prepare a list of moral traits which usually are closely related to each other; a list of mental traits; a list of social traits. Also a list of character traits which are very loosely related to each other. How do you account for their being so loosely integrated? What is the significance of this fact for moral education?
10. To what extent is the mathematics work in the first or second grade of the elementary school based on the Culture Epochs or the Recapitulation Theory? The mathematics work of the junior high school? Of the senior high school?
11. If the mathematics or English course of elementary school and high school were based entirely on the Culture Epochs Theory, what materials now used would be eliminated?
12. What additional evidence is needed to prove the Utility Theory?

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CHAPTER XV

DISTURBANCES OF ADOLESCENT PERSONALITY

1. *Meaning of disturbances of personality*

Mental disorders adaptive difficulties. By disturbances of personality we mean those variations from the normal organization of traits which interfere with individuals' actual or potential effectiveness of adjustment. A lack of balance of traits exists due to the over-potency of some and the under-potency of others. Slight variations may be of no special significance, since the "normal" is not a well-defined point or average of traits, but is rather a central range within which the traits lie. If the strength of some important ones lies far outside this central range and is the actual or potential cause of significant maladjustment, then the individual has a personality disturbance or mental disorder. Slight variations should be observed, however, since they may become serious disturbing factors later on.

Many sorts of undesirable habits and trends have been referred to in Chapters XI to XIV. They are integral parts of personality and represent important divergences. It is not our purpose to discuss them further now, but rather to confine ourselves to those important deviations involving some mental or emotional twist. We have here an important group of conditions, well-known, frequently observed, and in some instances closely associated with other groups of undesirable habits. Probably the clearest lines of demarcation are found in the individual's emotional responses and the place of reality in his reactions. Mental disorders are really adaptive difficulties. The individual under stress of the circumstances of life may resort to many subtle forms of

conduct which are not the best ways of meeting such conditions. Campbell says:[1]

We have merely to discard our mediæval attitude toward these sick or handicapped people, and to study the problem which they present as a problem of human nature working under difficulties. We have to study the disorderd behavior of the total organism in the same way in which we study the disordered behavior of a single organ.

Meaning and significance of mental adjustments. Since disturbances of personality are really faulty mental adjustments, we should now ask ourselves just what the term means. Harrington[2] has given a clear statement. He says:

Mental adjustment may be defined as the process by which the individual is brought into harmony with his environment and the demands of his own nature. In order that we may be impelled to perform those functions required of us as individuals and as members of society, nature has given us certain appetites and instincts which, as a rule, give rise to useful forms of behavior. Sometimes, however, circumstances are such that it is neither possible nor desirable to gratify them. It is, therefore, fortunate for us that within certain limits we are able to modify and control these forces, so that they will not impel us to seek the impossible or bring us into conflict with our own best interest or the best interest of our fellows. A man is not in harmony with himself or his environment when the demands of his appetites or instincts are unsatisfied. To adjust himself, to restore this harmony, he must do one of two things; he must if possible so modify his environment as to obtain from it that which his nature demands, or he must modify his tastes and desires so as to bring them into harmony with that which is possible of attainment. Life is one long series of adjustments and readjustments, for we are constantly finding ourselves in new situations to which we must react either by modifying the environment to match our demands, or by modifying our demands to fit them

[1] Campbell, C. Macfie, *A Present-Day Conception of Mental Disorders*, p. 26.

[2] In *Mental Hygiene*, vol. 4, pp. 377–78.

to an environment that we are unable to improve. Some people make these adjustments well. Some make them very poorly. For example, one resigns himself cheerfully to the inevitable; another, unable to modify the demands of his nature to fit the situation, frets and chafes under it, or even is carried along by emotional forces he cannot control into unwholesome habits of thought and conduct, which may depart so far from the normal as to constitute a psychosis.

2. *Social waste from personality disturbances*

Unnecessary social waste. Disturbances of personality entail an enormous loss to society, a great social waste, since so much of it is unnecessary and would not occur if we gave as effective care to the minds of children and youth as we often give to their bodies. The proportion of children, youth, and adults who have serious mental disorders is relatively small indeed; yet the annual cost in money of maintaining public and private hospitals for the insane, sanitariums, rest cures, and numerous other institutions for the treatment of mental disorders runs into the millions, and represents only a small part of the total cost. The loss of time, the decreased effectiveness of effort, the positive harm often done others, as well as the great amount of unhappiness resulting from abnormal deviations of personality, are an even greater social cost. That serious mental disorders are costly is recognized by all. That many of them are preventable, if treated in time, is the belief of practitioners in this field.

If the divergences take the form of delinquency, their significance is likely to be recognized — at least, after the youth has become delinquent; but if he shows easily observable signs of poor methods of adjusting himself to situations (as hereafter described), either no attention is paid to them or it is assumed that he will learn better or outgrow them. In its endeavors to develop suitable conduct-responses or trends of behavior, the school cannot wisely limit itself

merely to helping pupils secure knowledge of the content of the school subjects and the best methods of acquiring it.

An illustrative case study. *Marvin M.* was a tall boy of fourteen in the first year of a large junior high school. He had failed of promotion twice before entering junior high school, but his record thereafter was even worse. He quit school at seventeen, when he was in the eighth grade. His physical condition and general health were good. His teachers thought him lazy and stupid. His school work was very unsatisfactory, and he gave little evidence of ever trying to work. Teachers and principal had conferences with him and tried to get him to work, but apparently without effect. He took no part in extra-curricular activities. Directed game work, which constituted a large part of the work in physical education, likewise came to have very little appeal for him. In competitive games neither side wanted him. His case became much worse as time passed. He became more of a dreamer than before, and it was more difficult to draw him out of his reveries. His classmates, of course, were used to him; although he was with them in school, he was not one of them.

He was not, however, a stupid boy. On the Stanford-Binet test he had an I.Q. of 107. Even more significant than the I.Q. was his irregularity at different levels. He passed two of the sixteen-year tests, the problem of the enclosed boxes and repeating six digits backward. At the eighteen-year level he passed two tests also, repeating thought of passage heard and repeating seven digits backward, although he failed to repeat eight digits earlier in the test at this level. It seemed difficult for him to keep his attention centered upon the tasks at hand. Constant urging by the examiner was necessary to keep him trying.

He is now nineteen. During the two years since he quit school he has tried several jobs, but has lost each one in a

very short time, presumably because he was lazy and wouldn't work — in reality, however, because he was engrossed with his reveries, and was so inattentive that he didn't know what to do, even in such simple tasks as delivering groceries for a small neighborhood store.

Here is a young man in good physical condition, possessing a good mind, but so much preoccupied with his day-dreams that he is not as efficient as a wide-awake, energetic boy of fourteen. Even though necessity may later force him to meet daily tasks squarely and directly, yet he has already wasted many opportunities.

Other cases show more serious disturbances. All of them detract from the effectiveness of the youth's personality and are an actual or potential social waste.

3. *Incidence of disturbances of personality and its significance*

Many faulty adjustments during childhood. The great majority of adolescent maladjustments have their beginnings before puberty, often many years before, so that definite undesirable trends are present when the teens are reached, as shown by the following case, reported by Dr. Richards,[1] from whose detailed account we quote.

B. H. was a boy of thirteen in the seventh grade when he was referred to the writer for "temper tantrums."

The father is a junk collector, taciturn and unsocial; the mother is a quiet little woman, ambitious and friendly. Besides the patient, there are two other children, who are bright, docile, and steady. The family live in a poor locality and evidently struggle to keep afloat. The patient has gone rapidly through school, easily leading his class except when he had a tantrum or "sulky spell" and then "loafing" for several days. His tantrums began in the third grade. Since then they have appeared more frequently, at times with no obvious provocation, and again when the

[1] In *Mental Hygiene*, vol. 4, pp. 343–45.

patient has been "crossed" in some trivial way. He has shown no patience with detail, but a desire to quit if he cannot do a thing at once. In his outburst he either remained mute for hours at a time or else beat his head against the floor, cursing and yelling so that the class was disorganized. Among the boys he was noted as a fighter with his tongue, but a coward when it came to blows. At home the mother described him as beyond her reach. The father assumed an irresponsible attitude towards the boy except to beat him when their ways parted. The patient's own story, as expressed during several interviews, throws the best light on his difficulties.

(Examination.) He was a clean, robust-looking boy who always wore a sulky, disgruntled expression. There were no spontaneous remarks. When speaking of his failures, he showed frankness and a certain amount of insight. (What do you think is at the bottom of these temper spells?) "I haven't any patience to try things that are hard. If I can't get a thing right off, I don't want to touch it again." (What are your ambitions?) "I care about standing first just to beat the others, but I'm not going any further in school." (Why not?) "Because I'd find something I couldn't do." (What do you do with your spare time?) "I read Rover Books." (Any games?) "I like baseball and can play a pretty good game, but I can't get along with the fellows. I did belong to the Public Athletic League, but I got out because last year we had a game and the captain said I was 'out,' so I wouldn't play any more." (How about the Boy Scouts?) "What's the use? I'd just get into fights with the boys and quit." (What do you do all summer?) "I just stick around and read. Sometimes I play marbles with the boys in the street, because if I get mad, I can just go off and leave them." (What plans have you after leaving school?) "I'll get a job at the dry docks at twelve dollars a week." (Suppose the boss finds fault with you because you don't work fast enough?) "I'll quit and get a job at sand-papering at ten dollars a week." (And suppose your back aches, and the dust makes you cough, and the boss "bawls you out" because you haven't done as much as he thinks you should?) "I'll quit that, too." (What about two jobs in a week?) "I don't want to talk about this thing any more. I'll get along some way. I can always buy junk like father. If a man fusses with him, he just goes on and leaves him."

The patient left school as soon as he was fourteen. Since leaving, he has been spasmodically interested in collecting junk with

his father. Between these spurts of activity, he loafs in sullen rage over the last straw which has happened to fall across the path of things as he would like to have them.

One is struck by the fact that this husky, well-developed lad, with a bright mind and good living habits, should find nothing in life to arouse his interest or enthusiasm, and that, in spite of a surprisingly clear understanding of the exact hitch of his troubled adjustment, he remains passive toward any attempt to modify the situation. He knows well that his characteristics of behavior doom him to an economic and social status far below that to which his intellectual assets entitle him. To discuss the matter from the standpoint of an epileptic equivalent, or of laziness or natural perversity, is interesting, but quite beside the fact that here is a child who has very satisfactorily discharged the obligations of the school curriculum and yet is launched upon adult life wholly unprepared to meet its problems.

Haggerty [1] sought to determine the incidence of undesirable behavior by a study of 800 pupils in an eight-year ele-

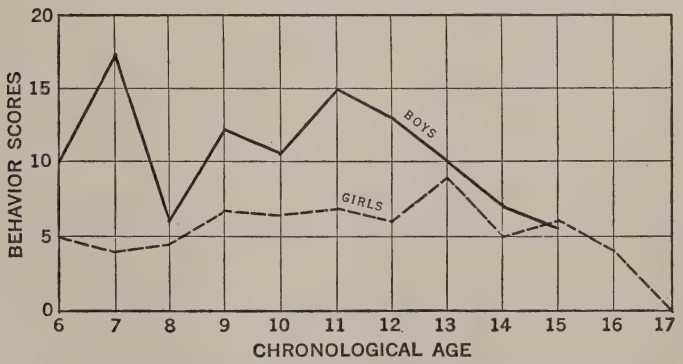

FIG. 78. UNDESIRABLE BEHAVIOR SCORES, AGES SIX TO SEVENTEEN (Haggerty.) N = 801.

mentary school in Minneapolis. His results (Fig. 78) indicate that undesirable behavior patterns are formed before

[1] In *Journal of Educational Research*, vol. 12, pp. 102–22.

puberty. While some of the types, such as disinterest in school work, unnecessary tardiness, etc., are not especially significant of any serious deviations of personality, yet 3.5 per cent of the children were nervous and psychopathic, and 32.0 per cent had personality defects.

The records of clinics and the experience of clinical workers attest to the early appearance of more serious types of deviations. Since preventive measures are preferable to remedial ones, the mental hygiene of pre-adolescence is very important.

4. *Thwarting*

Innate and modified tendencies. The child has many inborn tendencies to mental, emotional, and physical (or motor) activity. Stimuli from the outside world or from within his body set off various sorts of responses in accordance with these innate tendencies. These innate trends are modified by experience, by events in the environment. Their modification begins in infancy. Modified tendencies, however, are quite like the innate ones from which they are built up. They are activated by stimuli from within the organism and by stimuli from the external environment. This native and acquired equipment includes impulses to action, which may become conscious if the reaction is delayed. Now states of readiness and conscious impulses to action are exceedingly important dynamic factors in human conduct.[1] Thwarting such impulses or preventing their direct expression may cause personality disturbances.

"Never thwart or repress." Superficial observers and popular speakers and writers on child training not only have followed the lead of more serious students of human nature and of mental disorders in laying stress upon the evils that may follow thwarting the child's impulses and desires, but have

[1] See Chapters VII and VIII.

gone much farther than the latter see any sound reason for going. One notes from time to time that serious credence is given to the dictum that the child's impulses and desires should never be thwarted or repressed. He hears that dire consequences will follow thwarting; that the child's initiative leadership, and other similar traits will be interfered with; and that the seeds of mental ill-health and personality disturbances will be sown.[1]

Let us, therefore, examine this matter further and see if thwarting is unnecessary and, if so, to what extent it should be avoided.

Thwarting of instinctive tendencies unavoidable. However attractive the view may be that the child's native impulses should never be thwarted or repressed, we do not see how it can be accepted, because it disregards two highly important fundamental facts; (1) in the very nature of the case, thwarting cannot be avoided; (2) within certain limits thwarting and redirecting innate tendencies are desirable for the general social welfare. We will now examine these two propositions, in order.

Thwarting due to the child's innate disposition. That

[1] A boy of twelve, uncontrolled at home, was the source of much trouble in a good public school. He was irrepressible, insubordinate, and a general nuisance of the spoiled, smart-Aleck type. He was punished in one of the milder ways open to teachers in schools not allowing corporal punishment. His mother, an intelligent, well-read, somewhat superficial woman from a well-to-do home, came to interview the teacher and principal. She insisted that under no circumstances should her son be punished — that punishing him would prevent his developing leadership.

Such cases are not isolated. Teachers and principals attest to the hold this view has secured upon many parents. From a rigid control which was often brutal, manifested itself in anger, and was not suited to train children in self-control, the pendulum in many cases has swung to the opposite extreme, and the child is growing up without the wise direction and control of the mature — the creature of his archaic innate tendencies as modified by fortuitous circumstances of his environment. Neither extreme seems advisable.

thwarting is unavoidable becomes apparent when we note the child's equipment of instinctive tendencies, many of which are antagonistic to each other. Thus the impulse to manipulate, to explore, or to be curious about objects may be opposed by fear of the unknown or of some loud noise. Love of adventure and fear of bodily harm or vague fear of the unknown, mastery and submission, impulses to act selfishly or unselfishly, the desire for rest and the desire to achieve — these are a few of the many antagonistic trends which readily come to mind. Fear and hunger, two important innate tendencies, are often antagonistic; the individual in a given situation may experience both, the one resulting in impulses to one set of responses, the other leading to an entirely different or opposite set. Even if one holds, as do some behaviorists and other students of human nature, that the infant's innate tendencies are much less numerous than psychologists have usually thought them to be, still antagonistic trends are found.

Obviously, then, the child's own inborn nature contains elements which, in their direct expression, are antagonistic to each other, and lead to thwarting. But this is not all.

Thwarting due to external environment. Innate tendencies and the developments which come from them are often thwarted by natural obstacles or events in the environment. Fire, flood, drought, heat, cold, poor soil, and other similar things often thwart impulses and desires, as do many other circumstances, such as the superior business acumen of one's competitors, business depression, unemployment, excessively hard work (or even steady employment), physical deformity, accident, disease, the falseness of friends, the death of near relatives and close friends, and many other "vicissitudes of life." Actual life conditions, however favorable, do indeed constantly thwart innate and acquired tendencies and desires.

We see, then, that the youth's impulses and desires are thwarted, both by the very constitution of his inborn traits and by natural obstacles and events of even the most favorably arranged environment; and that, as a matter of fact, the hope of avoiding all thwarting of his desires and impulses is merely a Utopian dream.

Thwarting of tendencies for the social good. Another important fact must not be overlooked; namely, that habits, ideals, manners and customs, religious beliefs, and moral codes, to which the individual is trained and habituated, are a prolific source of thwarting. Many instinctive trends are inhibited by these acquired behavior-patterns. Some students of human nature regard such restrictions as unmitigated evils. Other extremists (at least according to their opponents) believe that restrictions, in and of themselves, are wholly good. We have seen in the preceding chapter that the doctrine of nature's infallibility is untenable, and is not supported by the facts; that the child's innate tendencies need to be, and, in fact, are modified and redirected so as to condition those responses appropriate to the circumstances under which he lives.

If a child sees an attractive object, he has an impulse to pick it up, play with it, and keep it. He has many other self-centered impulses which conflict with habits and ideals of honesty and have, therefore, to be modified so that other desirable impulses may find their proper place in his character. Any one can readily prepare a list of tendencies which have to be redirected for the general welfare of the group.

The history of civilization, of man's efforts to raise himself above the brute, is the story of an endless struggle between his impulses, and of his attempt to subordinate his lower to his higher nature. The development of social consciousness illustrates the same struggle between conflicting tendencies, for example, in the development of the right of property, and

of the moral and legal codes designed to protect individuals in that right. People have always detested sneaking and deceitful actions, and have admired courageous, frank behavior. The admiration of primitive peoples for the physical prowess, courage, and openness of robbery made it a less serious offense than thievery with its secrecy. Westermarck [1] says:

> In ancient Teutonic law theft and robbery were kept apart; the one was the secret, the other the open crime. In most law books robbery was subject to a milder punishment than theft, and was undoubtedly regarded as far less dishonorable. Indeed, however illegal the mode of acquiring property may have been, publicity was looked upon as a palliation of the offense, if not as a species of justification, even though the injured party was a fellow countryman. This difference between theft and robbery seems still to have been felt in the thirteenth century, when Bracton had to argue that the robber is a thief. But in later times robbery was regarded by the law of England as an aggravated kind of theft.

We find on all sides illustrations of man's becoming conscious that certain ways of doing things were not for the general welfare, and of his attempts to change his own ways. To modify and redirect innate and acquired tendencies he has seen fit to set up a system of laws, courts, jails, and other penal institutions, and to devise and enforce social taboos.

The conflict of tendencies and the inhibition of desires, and the facing of obstacles and the resolution of difficulties are thus not only inevitable, but are also valuable for learning (as we see in the following section) and for character development. Browning expresses this idea as follows:

> Then welcome each rebuff
> That turns earth's smoothness rough,
> Each sting that bids nor sit nor stand but go!
> Be our joys three-parts pain!
> Strive, and hold cheap the strain;
> Learn, nor account the pang; dare, never grudge the throe!

[1] Westermarck, E. A., *The Origin and Development of the Moral Ideas*, vol. II, p. 17.

Any scheme of child training or mental hygiene which ignores the unavoidableness and necessity of restricting and redirecting impulses and desires is faulty, and is not based upon essential facts. The expectation that we may avoid thwarting is doomed to failure. A wise policy in the guidance and control of youth neither assumes that all conflict or thwarting can be or should be avoided, nor neglects the evils that may and often do result from it; but rather does it recognize that restrictions are inevitable and often desirable, and that they are to be secured through habituation which does not harm the youth in other respects.[1]

Results of thwarting. What happens when instinctive impulses are blocked and their direct expression prevented? The individual tries to secure their expression in some other way. The principle of readiness indicates that whenever instinctive or acquired tendencies are ready to act, for them to do so is satisfying and for them not to do so is annoying. Accordingly, any blocking of impulses is annoying, and the individual tries repeatedly to secure the satisfying state of affairs and to avoid the annoying one. He may try one response over and over again before changing to some other one, or he may change it very quickly. When his impulses (native and acquired) conflict with each other, when they are blocked by obstacles in the environment, or are thwarted by his habits, ideals, and beliefs, the individual tries to find some way out of the dilemma. He tries again

[1] In discussing repression, Dr. Richards, from a wealth of psychiatric experience, says (*Mental Hygiene*, vol. 11, pp. 10–11), "Or there is the subject of repression, about which there are so many half-baked ideas afloat to-day. Where have they come from? They have come from a branch of psychiatric research which has overemphasized and overadvertised repression as a source of terrible consequence. Now repression is an essentially normal necessity, and at the same time, like everything else, it may be turned into a chance for harm to society and to the individual. In certain individuals and under certain conditions it is apt to lead to conflicts and sometimes to conflicts which are mismanaged and hence make us ill."

and again. By this try-try-again method he hits upon a response that is satisfying, or, at least, not positively annoying. It is a way out of the dilemma. Another time, under similar blocking, he hits upon the same sort of response and finds it satisfying as before. Through the repetition of such experiences he acquires habits of responding to many kinds of thwarting. Such habits of response or mental adjustments may be effective, or they may be very ineffective or positively harmful, as we see presently.

Individual differences in tolerating thwarting. Thwarting desires does not annoy all individuals to the same extent. Some can stand more than others. At the one extreme are those sensitive individuals (according to William James, the "tender-minded") who are greatly annoyed by the least actual or fancied blocking of their impulses and desires, whereas at the other extreme are those "tough-minded" individuals who are disturbed very little even by great misfortune and maintain their poise under the severest buffetings of fate. Others occupy intermediate positions, the greater number occupying a position about midway between the extremes. Psychogenic disorders [1] are found among those at the former extreme — those who are more sensitive to and more disturbed by blocking of impulses and desires.

5. *Introversion and extroversion*

Direct and indirect realization. When the direct expression of strong impulses and desires is prevented in any of the ways described in the preceding section, continued attempts to secure their realization may and very often do result in their indirect expression. One of the readiest ways of securing their indirect realization is the familiar substitution of imagination for reality. Suppose, for example, that an individual's surroundings are very unsatisfactory, are so differ-

[1] See Section 9 of this chapter.

ent from what he desires that they are very irksome. Their annoyingness may lead him to one of the following responses, the first one being that which would normally be made: he may put forth hard persistent effort to improve his surroundings; or he may spend much time in reverie, imagining himself amid highly satisfying conditions; or he may rationalize them, as described in the following section. Balked in the actual realization of his desires, he may resort to daydreaming and substitute the enjoyment of fancied satisfying surroundings for any active attempts to secure the desired conditions.

At one extreme is the individual who finds satisfaction, happiness, or "the unconditioned value" outside himself; at the other extreme is the person who finds it partly (at least) within himself. Between these extremes are the vast majority of individuals. Many show one form of adjustment in respect to some things, and the other form in respect to other things, so that all individuals cannot be classed with absolute precision as belonging to one type or the other. Yet the distinction is real and has considerable practical value. These two types are known as the extroverts and the introverts; their typical mental adjustments are called extroversion and introversion.

Meaning of introversion and extroversion. *Introversion* (Latin, *intro*, within, + *vertere*, to turn) means literally to turn (the mind) inward upon itself. *Extroversion* (Latin, *extra*, on the outside, + *vertere*, to turn) means literally turning (the mind) outside of itself, i.e., on the outside world.

Many cases illustrating these two types are observed. *Marvin M.*, described in Section 2 of this chapter, is an introvert. His reveries, his dislike of games and of other social contact, his fondness for being alone, and his general lack of contacts with the world outside himself are characteristic of the introvert.

In sharp contrast with Marvin is an energetic, round-faced, red-haired boy of fourteen, *R. W.*, who entered junior high school in the same class with Marvin. Roy was a hustler. He was well-developed physically, although not nearly as tall as Marvin. His Stanford-Binet I.Q. was 116. He was always with a group of boys, was a leader and general favorite among them. He was never alone if he could help it. To be alone was a punishment to him. He went from one activity to another with a restless eagerness. He was at the bottom of much of the mischief in his class. He was neither self-conscious nor shy. When he met any difficulty he faced it frankly, directly, and vigorously, without worry or fear of the consequences; when it was past, he gave his attention immediately to the next situation that presented itself. He expressed his emotions rather freely and openly, and neither sulked nor was given to moody introspection. *R. W.* is an extrovert.

Forms of introversion. Introversion manifests itself in different forms. Thus the introverted youth may imagine himself a hero. If he is weak, puny, physically shrinking and afraid, and is little noticed by others, he may employ his imagination to make a compensatory adjustment. He may fancy himself an athlete of great prowess, the star of the football team, winning his school's hardest games by his pluck, strength, speed, cleverness, and absolute fearlessness. He takes great pleasure in these fancied exploits and in the honor, envy, and admiration in which he imagines himself held by all the students of the school. In his day-dreams he is the hero, now in one exploit, now in another, always winning, always showing wonderful qualities, always admired. He is a "conquering hero"; but he takes it out in fancy. He makes no effort even to win a place on any team for which his size and strength would qualify him if he really tried. He may even avoid participating in any athletic games, find-

ing many "reasons" for being excused from the game work of physical education. He may have good equipment for some sport such as baseball or football, and take much pride in it and talk glibly about the game, as Edward W. did (see page 390), but never use his athletic paraphernalia.

The child does not always picture himself a "conquering hero." Sometimes, especially when he feels himself badly treated, he may imagine himself a "suffering hero." Then he experiences imaginally many dire mishaps, all of them the undeserved result of his true worth not being appreciated. Finally, after much suffering and persecution his true worth is understood by those who formerly caused him so much suffering, but who are now heartily ashamed and quite filled with remorse. He is acclaimed a hero and receives the honor which he alone previously knew was his due. The small boy who runs away from home, or imagines himself running away from home on account of some fancied slight, and pictures in detail the consequences (which according to his fancy finally turn out to be very satisfactory to him), is an example of the "suffering hero" form of introversion. Pouting, self-pity, refusals to play or eat, and other similar responses are often due to this form of mental adjustment.

The harm in day-dreaming. Now, day-dreaming is not always harmful. If reality and fancy are not confused; if the dreaming is not so satisfying that it takes the place of overt action; if it does not interfere with achievement and with effective contact with the world outside the individual; then, within these limits, it is harmless. Children are imaginative. They read books and identify themselves with the heroes of the stories, and take part in the wonderful exploits recounted therein. Yet they usually suffer no harm thereby; in fact, they may derive much harmless enjoyment from their vicarious experiences.

On the other hand, day-dreaming may become an undesir-

able trait which should be broken up. If the child avoids other children and prefers to be alone; if he does not romp and play the games suited to his age; if he finds it difficult and unpleasant to make normal social contacts with other children; then his day-dreaming is undesirable. The great danger is that he will find his reveries so satisfying that he will resort to them and lose contact with the outside world of people and things. When introversion is so extreme that the individual does confuse reality and reverie, living wholly and systematically in his dreams, he usually is regarded as insane. The trouble with day-dreaming is that it may come to occupy too large a place in the individual's life. In the world of his fancy he can make things come out according to his slightest wish; in the world of fact, thwarting, defeat, and failure are grim realities. It is not surprising that many individuals resort to introversion as an escape mechanism.

6. *Rationalization*

Meaning of rationalization. Another form of mental adjustment which is likely to interfere with effective personality is the irrational process known as *rationalization.* Typical cases of rationalization clearly reveal ineffective, irrational modes of thought. Data are sifted neither impartially nor in accordance with logical considerations, but according to personal desires, wishes, or prejudices. Great importance is attached to evidence supporting the things the individual desires, whereas opposing facts are disregarded. In mild forms an individual alleges reasons for a decision or a line of action which are not the real ones, but are merely excuses. He knows, too, that the "fake" reasons are not the real ones, but merely uses them because he wants to conceal his true motives. Such mild forms are not especially significant for mental health, since those using them are not confused by their own explanations.

In more serious cases, however, the motives of action lie far beneath the surface, and may be unknown to the individual himself. He accepts the false beliefs, and does not know that his judgment is so warped and his reasoning so twisted that his intellectual faculties are employed merely to work over and sift data according to his personal desires. In many cases of paranoia, rationalization is found in the characteristic delusions of jealousy, persecution, and grandeur.

Forms of rationalization. Thwarted in his attempts to secure some desired object, the individual may seek to escape the annoyingness of his failure by rationalizing it in some one of the following ways: first, he may "project" the cause of his failure to some one else or to unfavorable conditions in the environment, instead of acknowledging that his own lack of effort or ability was the cause; second, he may assume the attitude of the fox toward the grapes and minimize the value of the object he failed to attain; or he may assume the "Pollyanna attitude" that whatever happened is somehow for the best; that it might have been worse.

Projection is a universal tendency among children, and is very prevalent among adults who seem not to have put away childish shirking of responsibility for their own actions. It has been well portrayed by Ben King in his poem, "Jane Jones." The small boy, conscious of his lack of achievement and goaded by a schoolgirl's account of the humble beginnings of great men, disclaims all responsibility for his own shortcomings by blaming them upon his environment. Being told that Benjamin Franklin brought electricity from the sky with a kite, bottle, and key, he excuses himself by saying,

> Of course what's always been hinderin' me
> Is not havin' any kite, lightning, or key.

He comments on Columbus's discovery of America in this manner:

> Of course that may be, but then you must allow
> There ain't no land to discover just now.

Many a lazy student in high school blames his poor marks upon his teachers: the examinations weren't fair, the teachers "have it in" for him and never give him what he deserves. Or, he says he wasn't feeling well when he took the examinations, he had a headache, or some other alleged ailment. The athlete, withdrawn from a game for poor playing, blames the coach for not giving him a chance to get started, or alleges some player would not work with him, or limps from the field as if injured, or tries in some other way to shift the responsibility from his own shoulders.

Others assume the "sour-grapes" attitude. A lazy student, or a student who works but little, may excuse his poor marks by saying that he doesn't believe in working merely for marks. Or the boy may rationalize his failure to get on an athletic team by saying that he could have made it if he had tried, or that being on a team takes so much time and interferes with lots of things one wants to do.

The "Pollyanna attitude" is illustrated by a picture of a tramp who had lost an eye, an arm, a leg, two fingers from the remaining hand, and all but one of his front teeth, and, clothed in rags and filth, was sitting on a park bench holding a crutch, his dirty, unshaven face wreathed in smiles as he said, "I'm glad I'm living; things could be worse." As a protection from worry over inevitable, uncontrollable misfortunes, this attitude may serve a useful purpose, but too frequently it is a lazy way of meeting untoward events. While we might admire the tramp for his cheerfulness, we should contrast his condition with that of a pioneer in the Northwest who had his feet and hands frozen in a terrible blizzard and had to have them amputated. In the face of poverty and these serious physical handicaps, he did achieve success, became a banker, and was at one time president of the Bankers' Association of his State.

Dangers of rationalization. In all these forms of rational-

ization, as well as in others whose description we must omit, the individual may become lazy and inactive, and may make no effort to shape events according to his desires. There is danger that the child will get in the habit of making excuses, instead of "making good." He may make excuses for the things he does, and also for the things he doesn't do. He may confuse personal desire and logical necessity as principles of interpretation. Rationalization is an ineffective mental adjustment. Children are quite prone to resort to it, but should be guided to utilize the more impartial, logical ways of handling the data of their experiences. In extreme cases of rationalization the individual is the victim of serious delusions — his organization and interpretation of experiences are contrary to those of the world about him. Even in milder cases it interferes with the development of wholesome, effective personality, as we readily see.

7. *Conflict of desires as a cause of personality disturbances*

We have seen in Section 4 of this chapter that thwarting of impulses and conflict of desires are unavoidable; that various substitute activities or compensatory mechanisms are employed when impulses and desires are blocked; and that some of these substitute activities are good, but that others are bad. In general, the substitution of wholesome vigorous activities is better than resorting to imagined ones.

Many believe that conflict of desires is a potent cause of disturbances of personality, and that continued emotional conflicts give rise to many mental disorders through the faulty modes of behavior which are built up. While there is a wide acceptance of the view that conflicts may be such a causal factor in disturbances of personality, yet there is disagreement on the mechanisms involved.

Psychoanalysts and psychologists not in agreement on mechanisms involved in disturbances of personality. Many

psychoanalysts, especially the Freudians, make much use of such terms as "repression into the unconscious," "unconscious ideas," "subconscious ideas," "the unconscious," the "subconscious mind," etc., in describing and explaining human conduct, both normal and abnormal. Psychologists generally deny vigorously the alleged existence and potency of "subconscious" or "unconscious" ideas. A discussion of this question would take us too far afield. Freud's views are set forth in his *Psychopathology of Everyday Life.* The extreme view of psychologists is well expressed by Dunlap in his *Mysticism, Freudianism, and Scientific Psychology,* from which the following quotation (p. 124) is taken:[1]

The Freudian doctrine of consciousness as a *stuff* which, after it has functioned, is stored away somewhere like the printer's type which is returned to its case after being used, has no more empirical basis than has an exactly corresponding conception of finger movements which, after having occurred, are somewhere stored up as motionless movements. Just as the movement exists only during the motion, so consciousness exists only while one is conscious: and just as the original occurrence of the movement leaves biological structures so modified that the movement may occur again, so consciousness, occurring once, leaves the biological mechanism so modified that it may recur.

To the question of where a thought is while we are thinking of something else, Dunlap replies:[2]

An unscientific psychology may answer: "In the unconscious mind"; but if we answer in non-mystical terms, we must say, "nowhere." The thought didn't exist at all in the intervening

[1] See also Gates, *Psychology for Students of Education,* pp. 199–204; James, *Principles of Psychology,* vol. I, chap. 4 (Habit); Pierce, *Our Unconscious Mind,* chaps. 1–3; Thurstone, Leuba, Lashley, and Jastrow, "Contributions of Freudism to Psychology"; in *Psychological Review,* vol. 31, pp. 175–218; Wells, *Mental Adjustments,* chaps. 1, 2, 4, 5, 8; White, *Mechanisms of Character Formation,* chaps. 3, 4; Woodworth, *Dynamic Psychology,* chap. 7; and Woodworth, *Psychology,* chap. 21.

[2] *Ibid.,* pp. 160, 161.

hours. . . . That which really persisted was an altered condition of the neurones: not a specific reaction or neural discharge, but an adjustment such that the discharge or the complete reaction may occur again on the proper stimulus.

The medical psychologists and psychiatrists are interested in treating persons suffering from mental disorders, whereas the academic psychologists have usually studied mental states which can be subjected to investigation by laboratory techniques. The former have concerned themselves with the basic, permanent, human needs and desires, although their methods are often unscientific — controlled experimentation and precise definition of terms often being conspicuous by their absence. Much may be said, however, for the view of Thurstone: [1]

The content of psychoanalysis, psychiatry, and the so-called new psychology is much more important than the content with which we have busied ourselves as scientific psychologists. The underlying relation between the life demands of the organism and the behavior by which these demands are satisfied is the subject of psychoanalytic study, and that relation is more important as a determinant of mental life, personality, and conduct than the stimulus-response relation to which we as scientific psychologists have given most of our effort.

Conflict a cause of maladjustment. Conflict of desires and thwarting of impulses *may* lead an individual to make ineffective mental adjustments which are to him a satisfying way out of his dilemma, as we have already seen. In cases of preventable disturbances of personality the individual has formed distorted habit systems; he has acquired ineffective behavior patterns. Accordingly, preventive mental hygiene includes habituation in suitable modes of response.[2]

8. *Classes of mental disorders*

Since the important disturbances of personality to which we are directing our attention in this chapter are, in fact,

[1] *Op. cit.* [2] See Chapter XVI, section 3.

mental disorders, we should discuss some of them briefly at this time. Many classifications have been made by workers in this field. Detailed discussions of such technical questions are found in the literature on the subject and need not concern us now. We present a classification that has been found serviceable. It is relatively simple, and does give teachers and parents some understanding of this highly important field which is basic to a sound grasp of the mental hygiene of childhood and adolescence.

Two main classes of mental disorders. Mental disorders may be divided into two classes, which, in turn, contain many sub-classes. The two chief groups of disorders are those which are closely associated with physical or chemical injury to the brain tissue, and those due to psychological causes or factors — the "functional diseases."

Disorders due to physical injury to the brain. Physical injury to the brain with loss of brain tissue results in mental changes, varying with the extent and gravity of the injury. The injury may be due to infection, hemorrhage, accident, arteriosclerosis, or other causes. The mental disorders thus produced are permanent. Two important disorders belonging to this group are: (1) general paresis, marked by a "deterioration of the mind and character due to a progressive damage to brain tissue, the cause being syphilis of the brain"; and (2) traumatic disorders which are caused by accidental injury to the brain. Hardening of the arteries (arteriosclerosis), senile decay, tuberculosis of the brain, brain tumors and abscesses, and other conditions are also accompanied by marked alterations of personality. In general, mental disorders resulting from definite physical injury to brain tissue have certain general characteristics such as: (1) memory defect (important events for some period of life — events happening during an interval of several years — are unknown to the individual; they are for him as if he

had never experienced them); (2) variation of judgment (sometimes very good, sometimes very bad, tending toward the latter); and (3) loss of power to grasp situations.

Mental disorders caused by chemical injury to the brain. Chemical injury to the brain results from the presence of poisons (toxins) in the blood. These disorders, the toxic psychoses, include those resulting: (1) from alcoholism (drunken furor, delirium tremens, hallucinations, and paranoid states in which ideas of jealousy, persecution, or poisoning are present); (2) from addiction to such drugs as opium, morphine, cocaine, heroin, etc.; and (3) from fevers, from poisons of various diseases, or from exhaustion. Psychoses from toxic causes may be permanent or only transitory.

Mental disorders attributable to psychological causes — the "functional diseases." Two chief groups of psychogenic disorders may be distinguished: (1) marked mental disorders or psychoses, which include the elation-depression oscillation (the manic-depressive psychosis), other forms of depression and excitement, paranoia (delusions, especially of persecution), and dementia præcox, known also as the insanity of adolescence; and (2) the neuroses (or psychoneuroses) of apparently well people. Under neuroses are included neurasthenia, psychasthenia, hysteria, and anxiety neurosis, which are described presently.

The disorders resulting from physical and chemical injury to brain tissue lie in the field of general medicine. We shall not discuss them further. In cases of mental disorder all the tests known to medicine should be used to determine whether or not it is caused by physical or chemical injury to the brain. Only after the tests show no evidence of such injury to brain tissue may the disturbance be regarded as psychogenic. The diagnosis and treatment of all mental disorders should be entrusted to competent psychiatrists and others who have adequate training along these lines.

9. *The psychogenic disorders*

9a. *The marked mental disorders*

1. The manic-depressive psychoses. The manic-depressive group of psychoses "fundamentally are marked by emotional oscillations, and a tendency to recurrence. Various psychotic trends, delusions, illusions, and hallucinations, clouded states, stupor, etc., may be added."

The manic psychosis manifests itself as an abnormal state of elation in which the individual is greatly excited, and feels more wide-awake, alert, active, and efficient than before. He also feels that he is better able to plan new things, and launches new enterprises with boundless enthusiasm; but he skips too readily from one idea to another, from one subject to another, apparently employing the most superficial associations. His critical sense and judgment are overwhelmed by his buoyant enthusiasms and boundless self-confidence. He may move about restlessly as if from some constant inner propulsion. His speech may become rapid and reveal his abnormal elations. He may show much purposeless activity, carefully preserving pieces of paper, pages of magazines, trinkets, and other things of no significance at all. Sometimes he may enact imaginary scenes, apparently in fun. Usually he is happy, but sometimes he is ill-tempered and irascible. Usually the elation increases rapidly until the manic stage is reached. After some time it subsides. Frequently it alternates with depression.

Depression is the opposite of elation. In the depressive state the individual feels "blue"; he is inactive, and speaks, thinks, and acts very slowly. He feels despondent, sad, or hopeless. He has a "feeling of mental and physical insufficiency," lacks confidence, and is vacillating in decisions, even on very simple matters. Having started some simple activity, he wonders if he really should do it. Self-criticism

is likely to be strong. He is prone to underestimate his own ability and achievement.

Elation and depression are common experiences of us all. Adolescents are often moody, alternating at times between the "delectable heights" and the "slough of despond"; but these are milder phases of the elation-depression cycle than the extremes which have just been described.

There is evidence [1] indicating that recovery from the manic-depressive psychoses is greater than from the other marked mental disorders, and that it takes place more frequently at the ages before twenty, and between twenty and twenty-five, than at later ages.

2. Other elations and depressions. Other states of elation and depression which are not clearly manic-depressive are sometimes noted. Some of them, induced partly by fatigue or disease, belong partly to the toxic-exhaustive group, already described. Other depressions involve hallucinations, paranoid trends (delusions of persecution), etc. The classification and discussion of these elations and depressions lie outside the scope of this volume.

3. Paranoia. Paranoia is the mental disorder characterized by morbid delusions of two or three kinds, such as persecution, grandeur, and jealousy. According to the classification of the American Psychiatric Association,[2] "The group comprises cases which show clinically fixed suspicions, persecutory delusions, dominant ideas, or grandiose trends, logically elaborated and with due regard for reality after once a false interpretation or premise has been accepted. Further characteristics are formally correct conduct, adequate emotional reactions, clearness and coherence of the train of thought."

[1] Pollack, "Outcomes of Mental Diseases in the United States"; in *Mental Hygiene*, vol. 9, pp. 783–804.

[2] *Statistical Manual for the Use of Hospitals for Mental Diseases.*

In delusions of grandeur the individual is possessed of grandiose ideas of his own importance. He is rich, wise, powerful. In delusions of persecution he imagines that everybody is against him; in severe cases he imagines that others are combined against him, are seeking to do him bodily harm — even are trying to kill him. In this state every event of his life is interpreted (i.e., rationalized) as evidence of persecution. He disregards all contrary evidence. Paranoiacs suffering from delusions of persecution are often dangerous. Believing that a certain person is seeking his life, the paranoiac may attempt, in fancied self-defense, to kill him. Often the individual suffers from both delusions of grandeur and of persecution. A possible connection is readily seen. Thoroughly imbued with ideas of his own great importance which are not shared by his acquaintances, he may readily believe that they are jealous of him, or are in league against him.

Many children try to avoid the responsibility for their own failures, some of them rationalizing their unsatisfactory conduct by mechanisms not very far removed from "persecution." This is a childish reaction which is to be avoided or eliminated through home and school training, because, even if it never reached the paranoid stage, it interferes with the development of wholesome effective personality during childhood and adolescence. Serious cases of paranoid trends seem to respond to treatment less frequently than do those suffering from the manic-depressive psychoses.

4. Dementia præcox, or schizophrenia. Dementia præcox, also called the insanity of adolescence, appears in greater proportions at adolescence, although it is found at later ages also. Dementia præcox means early (precocious) dementia or early insanity. Schizophrenia means a splitting of thought processes. The two terms are often used as synonyms. The disorder probably develops gradually, but

its onset may proceed for a long time unnoticed by parents or friends until it is a serious disorder involving marked, rapid, and readily observable changes in the youth's personality. It seems to have come upon him very suddenly. He is unable to concentrate his attention upon the things about him, or do any work requiring close application.

For guidance in the collection and tabulation of statistical data, the *Manual* of the American Psychiatric Association gives the following description:

> A seclusive type of personality or one showing other evidences of abnormality in the development of the instincts and feelings.
>
> Appearance of defects of interest and discrepancies between thought on the one hand and the behavior-emotional reactions on the other.
>
> A gradual blunting of the emotions, indifference or silliness, with serious defects of judgment and often hypochondriacal complaints, suspicions or ideas of reference.
>
> Development of peculiar trends, often fantastic ideas, with odd, impulsive, or negativistic conduct not accounted for by any acute emotional disturbance or impairment of the sensorium.
>
> Appearance of autistic thinking and dream-like ideas, peculiar feelings of being forced, of interference with the mind, of physical or mystical influences, but with retention of clearness in other fields.

The disorder is still a mystery. Authorities are agreed on only a few of its many problems. It has been regarded as incurable, but recoveries are reported in a small proportion of cases. Early detection and treatment are distinctly advantageous.

The boy or girl who is seclusive, shy, sensitive, and easily embarrassed, who has no bosom friend or confidant, who prefers to be alone, is more apt to develop dementia præcox than the child who plays well with other children and is not an introvert. The adolescent who is highly sensitive and introspective, who shows any sudden important change in

personality accompanied by inability to do any work, and at the same time is unable to give any account of his difficulty, is apt to have the beginnings of this disorder. Such cases are, however, to be handled by those trained in the treatment of mental diseases and not by laymen.

Types of dementia præcox. Four types of dementia præcox are distinguished.

a. Simple type. "Characterized by defects of interest, gradual development of an apathetic state, often with peculiar behavior, but without expression of delusions or hallucinations." [1] The youth who has done good work in school begins to avoid others and to keep to himself more than before, neglects his work, and indulges in extensive daydreams and idle plans, but makes no attempt to carry them out. He may be cross, or show evidences of worry; he may be restless and unhappy, or resort to "sudden uncontrollable outbursts of weeping, excitement, or temper."

b. Hebephrenic type. The second type includes "cases showing prominently a tendency to silliness, smiling, laughter, grimacing, mannerisms in speech and action, and numerous peculiar ideas usually absurd, grotesque, and changeable in form." Inability to concentrate, and deterioration also are characteristic.

c. Catatonic type. The third type includes "cases in which there is prominence of various peculiarities of conduct with phases of stupor or excitement, the latter characterized by impulsive, queer, or stereotyped behavior and usually hallucinations." Individuals suffering from this form of dementia præcox show muscular rigidity. Even in catatonic stupor, when the individual lies rigid and motionless for hours or even days, he may not really be in a stupor, since both memory and perception may be keen.

d. Paranoid type. The fourth group includes "cases

[1] *Statistical Manual for the Use of Hospitals for Mental Diseases.*

characterized by a prominence of delusions, particularly ideas of persecution or grandeur, often connectedly elaborated, and hallucinations in various fields." Deterioration or inability to concentrate on any mental work also is characteristic.

The four types are really various phases of the mental disorder known as *dementia præcox*, rather than absolute types; i.e., the distinctions are relative.

Discussing the significance of dementia præcox May[1] says:

> Dementia præcox with the highest admission rate to hospitals of any of the psychoses, its exceedingly unfavorable recovery rate, its extreme susceptibility to tuberculosis, and representing as it does over one half of the population of our hospitals, must unquestionably be looked upon as the most important form of mental disease with which we have to deal to-day. The number of cases of dementia præcox in Massachusetts and New York hospitals justifies the statement that there are approximately 120,000 persons suffering from this disease in the institutions of the United States.

We should also add, the number is increasing.

A case study of dementia præcox. We quote from the brief account of a case of dementia præcox reported by Dr. Anne T. Bingham:[2]

> Sadie, aged fifteen, . . . did good work in elementary grades, but slumped badly in her second and third terms in high school. She had never played much with other children, early displaying conspicuous irritability, quarreled with her parents and sisters, and not only showed no affection for any one, but was very antagonistic toward her father and blamed her mother for everything, including her poor school work and tardiness. As a matter of fact, the latter was caused by the slowness with which she dressed, this being partly due to her habit of gazing in the mirror and talking to herself. She was suspicious and uncoöperative with every one and definitely

[1] May, J. V., *Mental Diseases*, p. 460.

[2] In *Mental Hygiene*, vol. 9, pp. 23–24.

delusional. Since she was getting no benefit from school, she was discharged and referred to an organization that maintained a mental clinic. In less than a year she became so disturbed that her father sought to have her committed to a state hospital.

9*b*. *The neuroses or psychoneuroses of apparently well people*

Four groups of neuroses. Four groups of these milder mental disorders are distinguished. They differ from the marked disorders discussed in Section 9*a*, and have the following characteristics: Usually the neurotic individual alone, or those who know him well, are aware of his neurosis; he seems well physically, has a good appetite, and can do his work fairly well. Medical examination does not reveal any causal physical condition. The individual, however, feels that he cannot do his work as well as previously; that something interferes; that he becomes fatigued so easily. He feels vaguely that something is wrong; that some disaster impends; or he is troubled in other similar ways.

1. *Neurasthenia.* Neurasthenia (literally, "nerve weakness") has the following symptoms: The individual suffering from it is easily fatigued, mentally and physically; is irritable, complains of various sorts of symptoms, such as headache, backache, irregular shifting pains, or burning pains in the abdomen, reacts excessively to stimulation, and has varying degrees of depression.

2. *Psychasthenia.* Psychasthenia ("psychic weakness") is the condition of the individual who is constantly worrying and doubting, who feels that a thing is not so even when his judgment clearly indicates that it is. He is a victim of obsessions (feeling, for example, that he has committed some terrible crime when he knows he has not), of phobias or fears of special situations or objects, "of morbid doubts and impulsions, feelings of insufficiency, nervous tension, and

anxiety." "Episodes of marked depression and agitation may occur. There is no disturbance of consciousness or amnesia as in hysteria." [1]

3. *Hysteria.* Hysteria is a mental disorder marked by a form of "delirium, stupor, or dream states involving partial or complete amnesia." Some intense idea or emotion seems to lead to loss of function of some part of the body, as in hysterical paralysis, blindness, deafness, or speech defect, or to other disorder as in hysterical convulsions, although medical examination shows the absence of causal physical conditions. Individuals subject to attacks of hysteria are very suggestible.

4. *Anxiety neurosis.* The anxiety neurosis is described in the *Statistical Manual* of the American Psychiatric Association as follows:

> A clinical type in which morbid anxiety or fear is the most prominent feature. A general nervous irritability (or excitability) is regularly associated with the anxious expectation or dread; in addition there are numerous physical symptoms which may be regarded as the bodily accompaniments of fear, particularly cardiac and vasomotor disturbances; the heart's action is increased, often there are irregularity and palpitation; there may be sweating, nausea, vomiting, diarrhea, suffocative feelings, dizziness, trembling, shaking, difficulty in locomotion, etc. Fluctuations occur in the intensity of the symptoms and acute exacerbations constituting the anxiety attack.

Very few neurotic individuals become inmates of hospitals, but many of them are found outside. Neurotic children are found in school. Their early treatment by competent practitioners is important for their mental health and the development of effective personality.

Case study of a neurotic high-school girl.[2] *S. B.*, a four-

[1] *Statistical Manual for the Use of Hospitals for Mental Diseases.*

[2] Condensed from an account by Bingham, in *Mental Hygiene*, vol. 9, pp. 20–23.

teen-year-old girl in high school, was so eccentric that her teachers thought she was insane. She had forged a check in order to buy expensive presents for one of her teachers, and had cut classes. When one of the teachers, finding her in the hall one day, attempted to take her to the principal's office, she broke away and ran unceremoniously into the office, exclaiming, "I know you are going to expel me, but I wanted to come in and tell you myself that I have been cutting. You may send for my father, but not for my mother to come here." And then she added, with apparent irrelevance, "Don't you laugh at me!"

She came of a family given to much quarreling, of which she said: "We are all alike. We flare up over any little thing. We may sit down at the table in perfectly good frames of mind, then somebody says something that some of us don't like, a quarrel begins, and we all yell at once." The mother, in violent fits of rage, would throw her children to the floor and trample on them. She was critical and sarcastic. *S. B.* was so apprehensive and unhappy that her mother called her "funeral face." The other members of the family made very caustic remarks about her appearance with glasses, so that, although quite nearsighted, she wore them as little as possible. At parties if she danced she was ridiculed for awkwardness, and if she did not dance she was called a social grouch. She was self-conscious and had an oppressive feeling of inferiority. She was very lonely; but attempted to make no friends because she thought she was unattractive. "She craved encouragement, affection, and commendation, and there is no doubt that she sought to buy the favor of one of her teachers whom she liked, as well as to appear of some importance among her classmates, by bestowing elaborate gifts."

Her mental age was seventeen years (I.Q. 120). She began to fail in high school during the second term, but not on

account of poor ability. She was restless and flighty. Of her, Bingham says:

She showed a tendency to quick, thoughtless responses which she often corrected spontaneously before they were fairly uttered, and one felt sure that her behavior was often ill-considered and without foresight because so impulsive, and that her "pertness" was part of her attempt to compensate for shyness. She is very immature and has never gotten over her childish expedient of running away from unpleasant or terrifying situations.

Treatment consisted in pointing out the discrepancy between her excellent intelligence and her conduct. The mechanism of her behavior was gone over with her in detail and was explained to her teachers, who were asked to give her as much encouragement as possible. One took a particular interest in her and invited her to act as a special helper. She responded in a rather oppressively thorough manner, but was really efficient, and under the feeling that she was useful and that she was appreciated, she changed amazingly, becoming much happier, more responsible, and more stable, and improved greatly in her school work. All these changes lessened the home friction, so that conditions were pleasanter there. She was able to go to a girls' camp the following summer and from there wrote an account that any normal, happy girl might have written to one of the faculty who had shown a friendly interest in her. The following is an extract from her letter: "Yesterday, at 4 A.M. (imagine 4. A.M.!) I, who was always late at school, was awakened by a girl. I, who always hated darkness, dressed in the dark and ran down to the lake. We were going to watch the sun rise and then have breakfast on the top of . . . Mountain. The rising of the sun was exquisite! marvelous! wonderful! When we arrived at the top, we all rested. Then we made French toast. It was delicious."

Separation from her family for two months was doubtless of mutual advantage, and the impetus towards healthy living gained in camp carried over into the next year.

10. *Why adolescents are disposed to mental disorders*

Why do mental disorders appear during adolescence? Why is the youth's mental balance frequently disturbed during this period? To answer these questions we need only

turn our attention to certain well-known conditions characteristic of childhood and the teens. Three of these should be noted at this time.

1. *Faulty training during infancy and childhood.* In the first place, the youth during infancy and childhood has often acquired ineffective ways of solving his behavior problems. His behavior patterns have not been progressively modified as he has grown older, but have become fixed in distorted childish forms. He is not prepared to meet the greater and, in some respects, new demands of the adolescent years. This is merely saying that his training before puberty has been faulty and partially futile.[1] He has not been trained to know himself and understand his impulses and desires, to be responsible and at least partially self-controlled, and to be dominated by strong, worth-while purposes. If he has formed childish emotional responses; if he has resorted to subtle evasions of reality; if he has acquired inadequate, wrong, or vicious notions of sex through parental reticence or unwholesome companions; he is ill-prepared for puberty. The problems and difficulties normally incident to the teens put greater stress and strain upon him than are necessary. Sometimes mental disorders result.

2. *Unwise guidance and control during adolescence.* In the second place, parental and educational guidance and control during the teens are often unsuited to the individual's needs, and do not aid him in making effective mental adjustments, as we have seen in the discussion of adolescent emotional conflicts in Chapter VIII.

3. *Conflict of adolescent impulses and desires.* In the third place, we must remember that the youth does not understand the impulses and desires which are so strong during the teens. He does not know their proper place in a total scheme

[1] See Chapter XVI, section 3, on Mental Hygiene; and Chapter XVIII, section 2, on Parental Control.

of things. He does not know whether they are good or bad, should be yielded to or inhibited. Such conditions place him under a strain. The vast majority preserve their mental balance, but others, failing, are the victims of mental disorders.

Harrington quoted. On this topic Harrington[1] says:

But it is in adolescence that the ability of the individual to adjust himself is, as a rule, most severely tried, for as already pointed out, he has, owing to the new appetites and desires that now awaken, to make one of the most radical readjustments required of him at any period of his life, and in his efforts to make this adjustment he is severely handicapped by his ignorance and inexperience. He has to deal with new emotional forces of great strength, but of the nature and significance of these forces he knows very little. He does not know whether they are good or bad, whether he should yield to them or hold them in check; so he is carried along by a blind impulse seeking some means of emotional outlet, some source of satisfaction. This outlet, this satisfaction, he must find in his dealings with his fellows, in work and play, in the adjustment that he makes with the world about him. But of this world also he as yet knows very little. He does not know how or where he may obtain from it the means of satisfaction which his nature demands. So he gropes his way, seeking more or less blindly some adjustment that will satisfy his needs, and in this blind groping there is great danger that he may fall into unwholesome or undesirable habits of thought and conduct.

But even where his impulses lead him towards a satisfactory adjustment there is danger that he may be prevented from reaching it by misguided parents who have different views. His parents may exert their authority to prevent him from ordering his life as the needs of his nature dictate, forcing upon him instead a manner of life that is in conformity with their own views and desires, but that for him makes a satisfactory adjustment impossible. So we find that the weaker or less fortunate ones at this time are unable to adjust themselves. In some this failure to adjust shows itself merely in an emotional disturbance which may not swing beyond the limits of what we are accustomed to regard as normal. In

[1] In *Mental Hygiene*, vol. 4, pp. 378–79.

others, however, it results in unwholesome habits of thought and conduct, in bad sexual practices or anti-social acts, and in certain cases it manifests itself in types of mental reaction which we are accustomed to regard as manifestations of mental diseases. Of these cases some after a time are able to correct their unwholesome tendencies, and ultimately succeed in making a more or less satisfactory adjustment, while in others the faulty types of thought and behavior, instead of being corrected, only become more fixed as time goes on. These cases usually end up in hospitals for the insane, where they are labelled Dementia Præcox, and find their way to the chronic wards there to spend the remainder of their lives.

PROBLEMS FOR DISCUSSION

1. Does the inferiority complex operate to raise the level of achievement in a group?
2. Under what circumstances should the day-dreaming of the adolescent be broken up?
3. Make a detailed case study of an introvert.
4. How can the junior high school forestall some of the abnormal emotional developments of adolescents?
5. How can the inferiority complex be broken up in a very sensitive, timid boy? In a mentally dull but very sensitive boy?
6. The benefits derived from summer camps.
7. How to stimulate bright adolescents who have done good work but who recently have become day-dreamers and have slumped in their scholastic work.
8. Note some school practices tending to promote abnormal traits.
9. Discuss: Never thwart or repress.
10. Moral and religious codes as causes of thwarting.
11. Proportion of adolescents having personality disturbances due to thwarting by moral and religious codes.
12. Value of a trait rating chart or other means of early detection of undesirable trends.
13. Means of resolving conflicts.
14. *Laissez faire* as a cause of conflicts.
15. Stabilizing factors in the development of personality.

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CHAPTER XVI

THE HYGIENE OF ADOLESCENCE

The truth is that happiness is the most powerful of tonics.
HERBERT SPENCER

Handicaps to adolescent health. The two most serious handicaps to adolescent health are ignorance and indifference, reflected in the old saying that "What you don't know won't hurt you." An Italian shoemaker, whose thirteen-year-old son seemed tired, lazy, or possibly ill, said the boy got plenty of sleep, that he went to bed at eleven or twelve and got up at seven. When told of the amount of sleep recommended by physicians, he said, "Well, doctors all make mistakes; you can't depend on them."

A very intelligent, well-to-do, socially ambitious mother, living in a very different section of the same city, allowed her fourteen-year-old daughter to attend dances until twelve or one o'clock on "school nights," and gave no supervision to her diet, saying that the girl's own appetite was the best guide, although even a novice in dietetics would have known that the girl's actual selections were not at all wise. Ignorance and unconcern are found, undermining children's health, and preventing their achieving strong, happy, healthy manhood and womanhood.

Three important phases of hygiene — physical, social, and mental — are closely interrelated, and constitute the three sections of this chapter.

1. *The physical welfare of adolescents*

Importance of physical well-being during adolescence. The fundamental importance of physical health during adolescence, as well as before and after, is so widely recognized that we need only reëmphasize its value for the indi-

vidual's mental health, happiness, and general efficiency, and then turn our attention to problems of its development and conservation.

Value of health before puberty. Thus far in our discussion we have treated adolescence as an integral part of the individual's developmental period, rather than as a unique stage in his career, sharply contrasted with the years that precede and follow it. We have insisted upon development as a continuous process, finding no evidence for believing either that the adolescent youth breaks with his past or that the teens are characterized by the birth of a new self. We have emphasized the importance for adolescent personality of the years of childhood as well as those of the teens.

Considering now the physical welfare of adolescent boys and girls, we are again confronted by the importance of the years before puberty. One of the most important prerequisites to good health during adolescence is good health before the teens. During pre-adolescence, habits and information relating to personal cleanliness, eating, sleeping, posture, clothing, care of the eyes, avoidance of unwise exposure to wet, cold, and contagious diseases, fresh air in sleeping-rooms, exercise, and outdoor activities are valuable, and should have effective emphasis by school and home. If suitable habits along these lines are formed before puberty, very important steps have been taken to conserve the youth's health during the teens.

Puberty not necessarily a critical period. According to a widespread popular belief, puberty is a constitutionally critical period, especially in the case of girls. Many competent students of human nature, biology, and hygiene fail to find evidence supporting such extravagant notions. Bigelow,[1] for example, is probably correct when he says:

It is no longer scientific to assume that the pubertal period is

[1] Bigelow, M. A., *Adolescence*, p. 33.

constitutionally critical. . . . It is not natural to break down in adolescence. Nothing in the sexual maturing of well-cared-for animals gives evidence that the final physiological preparation for the reproductive functions is naturally an exhausting process.

The accumulating evidence is pointing toward the conclusion that the "critical" aspect of human puberty in highly civilized countries is probably due very largely to unhygienic conditions, most of which are preventable or correctable in childhood and adolescence.

Health often not conserved by the home. Many children live under conditions which undermine their health. Improper diet and poor nutrition, overwork, lack of play and recreation, too little sleep, and other undesirable conditions are common. Many children under ten years of age get no more than seven or eight hours of sleep a day. The writer knows several parents who are accurate in business and professional matters, who know that children six to eight years of age need eleven to twelve hours' sleep daily and that younger children need even more, but they allow their own boys and girls of these ages to stay up, or else they keep them up time and again until ten or eleven o'clock or even later, although the youngsters must be up by seven or seven-thirty the next morning. No great mathematical ability is needed to know that the children are not getting enough sleep.

The consensus of opinion of many observers indicates that the demands of health are quite commonly disregarded in respect to sleep, diet, exercise, and other conditions. Ambitious, restless parents often surround their children by continuous over-stimulation to activity, drag them about to many useless "social affairs," keep them in feverish excitement most of their waking hours, and then condemn the school if a child's health should give way under the strain. Children need ample freedom to play, to be with other children, to rest, to relax, to be natural, and to manage many of

their own activities, under supervision which insures good general conditions, but free from control by "Meddlesome Matties" who lay out every detail of every activity, and constantly urge them to other activities before they are through with those in which they at the moment are engaged.

Many features of child life show intensity, haste, and great effort. At other times one sees an apparent indolence or dilatoriness which some parents find quite irksome. We have observed a few cases in which well-meaning, intelligent parents kept their small children on the go so much that the unfortunate little tykes seldom had much time they could call their own. They were frequently dragged away from play to go to the movies, to go to parties, to call on "little playmates" (with whom, however, they had no chance to play, since they were "calling" on them), or do many other things more or less inane for five- and six-year-old children. We agree heartily with Bigelow's further statement: [1]

> Our young people between six and sixteen are living at an enormous speed for which Nature in her evolutionary processes never adapted any animal machine. The wonder is not that many break down in health during puberty, but that so many boys and girls seem to stand the strain fairly well. But how well we do not yet know accurately.

Factors in promoting the physical welfare of adolescents. Certain conditions have important effects upon the physical health of boys and girls in the teens. They are not essentially different at this time from what they were previously. Five of the most important ones are: (1) nutrition; (2) exercise and recreation; (3) sleep and rest; (4) sex hygiene; and (5) the heating, lighting, seating, and ventilation of homes, schools, and other buildings much used by children and adolescents. We have space for only the briefest treatment of these important topics and must, therefore, refer the

[1] Bigelow, M. A., *Adolescence*, p. 34.

reader to standard works on nutrition and diet, physical education, and school, educational, and personal hygiene for a fuller discussion. A few of these references are listed at the end of this chapter.

Nutrition and diet. The problems of nutrition during adolescence are essentially the same as those of the preceding years. The foods constituting a suitable diet at eight or ten are the valuable ones for the teens. During all of these years children need plenty of foods, which are rich in the elements necessary for growth. The total daily food needs are greater during early adolescence than they were before puberty, reaching a maximum at about age fourteen for

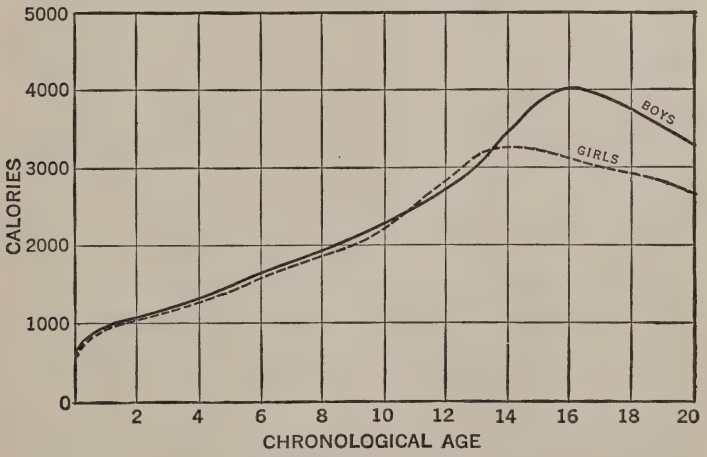

FIG. 79. TOTAL CALORIES NEEDED DAILY AT EACH AGE FROM BIRTH TO TWENTY
(After Holt.)

girls and sixteen for boys. Fig. 79 shows the daily amounts recommended by Holt for each age. They vary somewhat according to the individual. Boys and girls who are very active require more than the amounts shown in Fig. 79,

whereas those who are inactive require smaller quantities. Likewise adolescents at work need modifications to suit their particular needs.

Adolescent girls often show a craving for sweets, pickles, and highly seasoned foods. At other times they have very little appetite. Guiding the adolescent's appetite and selection of food is important, and sometimes difficult; but less trouble is met in the case of those who have been accustomed during pre-adolescence to a well-balanced diet than with those whose food selection has been determined by their own childish fancy and caprice.

Various writers on nutrition [1] emphasize the adolescent's need for such foods as the following: generous amounts of milk, cocoa, bread (whole wheat or graham) and toast, breakfast cereals, salads made of fresh fruits or green vegetables, meat substitutes containing eggs or cheese, custards, and puddings containing milk and bread, cereals or cornstarch; limited amounts of meat (according to Dr. Rose, two to four ounces daily), nuts, and raisins; only plain cakes and cookies; no pies except those of fruit, milk, and egg, and with little crust; warm biscuits, muffins, waffles, and griddle cakes infrequently and then not the main part of the meal. Water at meals (but not to wash the food down) and between meals is necessary. Coffee and tea have no positive value for youth, and may advantageously be omitted from the adolescent's diet.

Nutrition is so essential to health and growth that it must not be neglected by centering attention upon any one other factor. Any well-rounded program of hygiene gives a large place to the proper nutrition of the growing child.

Sleep and rest. Under the conditions of modern life

[1] See, for example, the following: Emerson, *Nutrition and Growth in Children*; Holt, *Food, Health, and Growth*; Rose, *Feeding the Family*; Willard and Gillett, *Dietetics for High Schools*; and other similar volumes.

so many attractive activities surround children, and they are so eager to participate in them, that failure to safeguard their health in respect to sleep and rest is not at all surprising. Then, too, the parents' own plans and activities often conflict with the child's best interests and he is neglected.

Authorities [1] differ in their recommendations of the amounts of sleep needed at various ages. In Table 39 are shown the median of the estimated needs of each age from seven to eighteen, together with the results of an investigation by Terman and Hocking into the actual hours of sleep of approximately 2700 American school children. The actual amount of each age is less than the median of the estimated needs, usually being approximately the same as the lowest estimate given by any of the authorities quoted by Terman.

TABLE 39. ESTIMATED SLEEP NEEDS (IN HOURS) OF CHILDREN AT VARIOUS AGES (MEDIANS OF ESTIMATES BY DUKE, BERNHARD, HERTEL, CLAPAREDE, *et al.*) AND THE ACTUAL HOURS OF SLEEP OF 2692 AMERICAN SCHOOL CHILDREN

(Data from Terman)

Age	7	8	9	10	11	12
Estimated need	11	11	11	10.5	10.3	10
Actual amount, American school children	10.4	10.4	10.1	9.6	10.0	9.4

Age	13	14	15	16	17	18
Estimated need	9.8	9.3	9	8.8	8.8	8.8
Actual amount, American school children	9.3	9.1	8.5	8.3	8.5	8.5

Wood [2] has recommended that children six to eight years of age have twelve hours of sleep daily (from 7 P.M. to

[1] See Terman, *The Hygiene of the School Child*, pp. 363–65.

[2] See Williams, *Healthful Living*, p. 326.

7 A.M.); ages eight to ten, eleven and one half hours; ages ten to twelve, eleven hours; ages twelve to fourteen, ten and one half hours (from 8.30 P.M. to 7 A.M.); ages fourteen to sixteen, ten hours (from 9 P.M. to 7 A.M.); and ages sixteen to eighteen, nine and one half hours (from 9.30 P.M. to 7 A.M.)

A great many children, exactly how many we do not know, are not getting as much sleep as they need. Since sleep is not only a period of rest and relaxation, but is indeed "the great restorer," its value for physical well-being is very great. If the child from infancy to puberty is short from three hundred to five hundred hours of sleep per year, and if his diet during these years is deficient or otherwise unsuitable, and if these conditions persist during the establishment of puberty, need we be surprised if maturation should prove to be a "critical" period in the youth's life?

Parents are directly responsible for the unhygienic conditions discussed in the foregoing paragraphs; unless their effective coöperation is secured, the instruction in hygiene and other similar measures are likely to fall short of their greatest effectiveness.

Rest and relaxation are needed by adolescents, and may be secured through many of the less active, less intense forms of recreation.

Exercise and recreation. Girls as well as boys need an abundance of exercise and outdoor activity, both before and during adolescence. Boys, however, usually fare better than girls in such matters. Girls are often under the serious handicap of having parents and friends frown upon many games and activities as too rough and tumble, and as making girls veritable tomboys. Social pressure, rather than any instinctive tendencies, leads the girl at nine or ten to give up many healthful outdoor activities and devote her time to quiet passivity, or inactive indoor "social" games. Many girls of ten or eleven years enjoy turning "cartwheels" on

suitable occasion, but in the eyes of many adults it is not "nice" for them ever to do so. Girls of ten, twelve, fourteen, or sixteen normally do enjoy outdoor life and the many games suited to their needs.[1]

The games and other group work in the best physical education and public athletic league programs are of great value. Through them children learn not only to get along together in attaining group purposes, but they secure valuable exercise that is at the same time highly recreational. Physical activity through games is preferable to the same activity as mere "exercise" from the "physical culture" of a bygone day. A well-rounded program in physical education includes a wide variety of activities, calisthenics, special corrective exercises, and games; it helps to keep the adolescent's time fully occupied, draws his attention away from himself, and diverts or sublimates the sex impulses which normally become so strong during the teens.

Often the work in physical education is seriously handicapped by meager facilities, excessively large classes, and other similar conditions. Recent years have shown a marked improvement in the public attitude toward the need for indoor and outdoor physical activities for both young and old. Fortunately, much of the prudishness which would deny girls their rightful heritage of physical well-being also is disappearing in many quarters.

Other recreational activities are of value to adolescents, if they are provided at suitable times, so as not to interfere either with the youth's getting adequate sleep or with other demands of hygiene.

Sex hygiene. Problems of sex hygiene during adolescence are discussed under Social Hygiene, farther on in this chapter.

[1] Consult, for example, Williams, *Personal Hygiene Applied*, or other similar works for specific suggestions on appropriate games for adolescent girls.

Hygienic conditions of home, school, and other buildings. The physical welfare of the adolescent is safeguarded by providing hygienic conditions in dwelling, school, shop, factory, or any other building in which he spends a considerable portion of his time. Standards have been set up for the heating, lighting, seating, and ventilation of buildings.[1] Since so many adolescents are gainfully employed, the conditions under which they work should be carefully safeguarded.

Provisions for physical health by home, school, vocation, and other agencies. The work of the home for the health of adolescents relates to such matters as diet, sleep, clothing, posture, outdoor activities, recreation, the formation of other suitable health habits, as well as the heating and ventilation of the home. The work of the school lies along similar lines and consists largely: (1) in suitable instruction in personal hygiene on such matters as sleep, diet, exercise, sex hygiene, and general care of the body; (2) in adequate provision for physical education — games, play, calisthenics, corrective work, etc.; (3) in hygienic conditions of buildings; and (4) in arranging the schools' scholastic demands somewhat in accordance with the abilities of pupils.

The physical health needs of those gainfully employed are met: (1) by hours and kinds of labor that are not too exhausting; (2) by provision for brief rest periods when needed; (3) by the elimination of unnecessary dangers or hazards; (4) by hygienic conditions of buildings or other places in which youth work; and (5) by opportunities for participation in games and other physical and recreational activities.

Finally, we should note that the community or some other unit of organized society has the task of insuring certain

[1] See any standard text on school hygiene, such as Ayres, Williams and Wood, *Healthful Schools*; Dressler, *School Hygiene*; see also Averill, *Educational Hygiene*, chap. 13.

standards as to: (1) purity of water, milk, and other food supplies; (2) air pollution by industrial establishments, or other causes; (3) garbage and sewage disposal; (4) prevention and control of communicable diseases; (5) general safety; and (6) other similar conditions — all of which are conducive to the general health of the population of all ages.

2. *Social hygiene*

Meaning and importance of social hygiene. Social hygiene treats the many problems of life arising from the various manifestations of the sex instinct. It embraces sex instruction and sex hygiene, which is an important objective of such instruction.

Problems of sex education. According to Bigelow,[1] the problems of sex education may be divided into two groups — constructive and preventive. The former relates to building up wholesome ideas and ideals about sex and developing a proper understanding of the value of "healthy and happy marriage and parenthood" to replace a common attitude of secrecy, vulgarity, and disrespect toward sex. To develop a wholesome attitude toward sex, young people must be led through teaching, guidance, and personal example to disregard the vulgar conception of sex as shown by many books, movies, plays, vulgar dances, newspapers, etc. Part of the program undoubtedly will require the suppression of the more vicious representations; part of it will consist in raising standards of taste — a slow process, but highly effective nevertheless.

Contributions to an understanding of the worth of healthy happy marriage and parenthood can be made by teachers of sociology, home-making, and psychology in high schools and colleges.

Preventable problems include the following: (1) personal

[1] *Adolescence*, pp. 52–58.

ill-health from unhealthful and largely preventable conditions of the sex organs; (2) illegitimacy; (3) promiscuity; (4) "sexual immorality, or failure to live according to the accepted moral code"; (5) sexual vulgarity; (6) failure of marriage through making needlessly wrong physical, mental, and social adjustments; (7) uneugenic parenthood; and (8) venereal diseases caused chiefly by promiscuity.

Sex instruction.[1] Evidence is accumulating that a sane, wholesome program of sex instruction can be a valuable means of building up suitable attitudes and ideals toward sex and desirable sex habits, because so much vice and social ill-health are initiated through ignorance, low ideals, bad companions, weak inhibitions, and other similar causes.

The consensus of opinion of biologists, physicians, psychologists, educators, and other students of human nature is that parents should impart sex information to the child gradually, and in proportion to his curiosity and capacity to understand it; that while the information given the inquiring six-year-old should be in different form and probably much different from that given the twelve- or fourteen-year-old, yet the former should be in harmony with the latter; and that falsehood and emotional stress be avoided with painstaking care. Progress or increase in understanding is as desirable along this line as it is in purely academic subjects. Some sex instruction has its place in the school, not in a special course, but naturally as part of regular courses in physical education, hygiene, biology, household arts, etc.

[1] For detailed information and suggestions on sex education during childhood and adolescence see references (2), at the end of this chapter. See also such books as the following: Armstrong, *Sex in Life*; Brown, *Child Questions, and Their Answers*; Cady, *The Way Life Begins*; Chapman, *How Shall I Tell My Child*; *Committee Report on The Teacher's Part in Social Hygiene*; Galloway, *The Biology of Sex for Parents and Teachers*; Galloway, *The Father and His Boy*; Morrow, *The Teaching of Sex Hygiene*; Snow, *Venereal Diseases: Their Medical, Nursing, and Community Aspects*; Torrelle, *Plant and Animal Children: How They Grow.*

Details of such a program, and the most advantageous division of labor between home, school, and other agencies lie beyond the scope of this volume, being fully treated in the references cited in this section on social hygiene, and in those appended at the end of the chapter.

Sex hygiene.[1] Sex hygiene, an important objective of sex education, includes the health problems of the sexual organs. One of the most important of these concerns self-stimulation or masturbation of the sex organs, a practice indulged in by many boys and some girls sometime between the ages of five or six and fifteen years. While the effects of such practices are not now believed to be as harmful as they have sometimes been pictured, yet physicians and physiologists agree that they should be prevented or broken up.

Prophylaxis of self-stimulation. Bigelow[2] suggests the following five steps for preventing masturbation during pre-adolescence.

(1) Prevent irritation of the genital nerve-endings through cleanliness, loose, well-fitting clothing, and in some cases circumcision.

(2) Avoid giving children an opportunity. This involves careful oversight, allowing little privacy, and providing close supervision of intimate relations between children. A group of six or eight boys and girls, ages eight to eleven, from "good" homes in a good community, were found to be resorting to self-stimulation in a tent facing the windowless angle where kitchen joined the rest of the house. The tent was within a few feet of the home of one of the little boys, whose parents were horrified over the affair, but had sus-

[1] For a more complete discussion of sex hygiene of pre-adolescence and of adolescence see the following: Bigelow, *Sex Education*, chaps. 6 to 9; Exner, *Rational Sex Life for Men*; Hood, *For Girls and the Mother of Girls*; Latimer, *Girl and Woman*, chap. 5; McLaughlin and Tobey, *Personal Hygiene*; and other similar volumes.

[2] *Adolescence*, pp. 41–42.

pected nothing until the school's investigation of a different problem brought the whole matter to light, indicating gross carelessness on the parents' part for several weeks.

(3) Provision for "regular sleeping hours, cool bedrooms, light covers, prompt treatment of constipation, plenty of outdoor exercise," and other general hygienic conditions.

(4) Information concerning the general meaning of the sex organs.

(5) On occasion, "simply warning against handling the organs except for sanitary purposes. In giving such warning parents should be careful to speak as calmly as they would concerning any other things that the rules of health prohibit." The simple "do not" of early childhood may be replaced a few years later, according to Bigelow, by "doctors say it is best," etc.

During adolescence prevention will include, in addition to the five items just mentioned, the attempt to build up suitable ideals and motives for sex conduct through sex education.

Sex hygiene for adolescent boys. Adolescent boys are likely to experience two normal but disturbing processes, especially during sleep.

The first of these, nocturnal seminal emissions, frequently occurs among boys who are sexually self-controlled, and is very disturbing to them, unless they have been informed by some reliable person (preferably the boy's own father) that so far as known no reason exists for believing this process harmful. Unless the boy approaching puberty has this information, he may be so perturbed by the appearance of this process as to fall the prey of quack doctors.

The second process, known to physicians as "erection," is due to involuntary changes in the circulation of blood in the sex organs, and is often accompanied by very disturbing desires which make self-control a difficult problem. Compe-

tent physicians advise plenty of hard physical and mental work, a great deal of vigorous play, regular sleep in cool bedrooms with light covers, sleeping on either side rather than on the back, taking cold baths, avoiding sexually stimulating situations, and other features of hygienic living.

Sex hygiene for adolescent girls. Sex hygiene for adolescent girls centers about menstruation. While investigation [1] has shown that women (college students and instructors and a few trained nurses) did about as well on certain physiological and psychological tests during the menstrual week as at other times, yet we should not interpret these results as indicating no need for any modification of physical activities at these times. These findings are another illustration of the fact that one may do effective physical or mental work even though feeling quite ill. Nor do these results suggest anything about sex hygiene for girls who are maturing. Competent physicians and specialists in physical education advise against violent and prolonged physical exercise during the menstrual period, such as running and jumping as in hockey and basket-ball; yet at the same time they advise regular but moderate exercise. They also advise against getting chilled or wearing wet shoes and stockings. Dr. Caroline Latimer says: [2]

> I repeat that the essential thing in the hygiene of the menstrual period is that the burden of life, whether in mental or physical relations, shall be lightened in one way or another, especially during the earlier part of the time. . . . There is no reason why a healthy girl should not go to school, at any rate after the function is fully established, nor that she should not walk there, if she is in the habit of doing so and the distance is not great. But her school work ought to be carefully watched, and it may be better to keep her at home for a few periods while the function is becoming established.

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[1] See Hollingworth, *Functional Periodicity in Women.*

[2] *Girl and Woman,* pp. 113–15.

Dr. Howard A. Kelly, professor emeritus of gynecology in the Johns Hopkins Medical School, likewise advises avoidance of excessive effort of body and mind during the menstrual periods, saying that if the girl "neglects this salutary precaution her health will suffer in the long run."

In many small high schools men teachers coach the girls' athletic teams. In some high schools men who are not teachers, and who have no direct responsibility to the school, coach both boys' and girls' teams, and often, on account of the popularity of athletics, have more influence in the community in determining the place of athletics in the school program than the teachers themselves. Both conditions are neither desirable nor conducive to the best care of the high-school girl's physical welfare. The latter condition is administratively unwise because it delegates school work to individuals over whom the school has no control, and sometimes subordinates the general policies and athletic interests of the entire school to a narrow program of competitive athletics. Whenever girls' teams are coached by a man, a woman teacher should be a close adviser who sees that the girls' physical health at the menstrual periods is properly safeguarded.

The health of adolescent girls at work needs corresponding care which, however, in some respects is more difficult to provide.

3. *The mental hygiene of adolescence*

Meaning and importance of mental health. By mental health we mean not merely the absence of disease, but rather the "ability to attain and maintain satisfactory human relationships." [1] This broad, functional view lays emphasis upon adaptation. The individual in good mental health can make reasonably effective and satisfactory adjustments

[1] Williams, in *Mental Hygiene*, vol. 11, p. 483.

to the conditions of life, through modifying either the external environmental circumstances, or his desires and ambitions, or both external conditions and desires, so as to attain harmonious relations. Other human beings, of course, form an essential part of his surroundings. Persons in poor mental health sooner or later manifest some form of mental disorder, whose more serious forms have been briefly described in Chapter XV. The criterion of mental health is as broad as life itself, and touches it at every important point.

The mental hygiene of adolescence is of prime importance, involving as it does problems of personality, of character, of the total organization of the youth's physical, intellectual, and emotional traits, and of their interaction with the conditions and events of his environment.

Pre-adolescence characterized by difficulties of adjustment. Adaptive difficulties confront the child from his earliest infancy. His impulses and desires come into conflict with each other, and with the objects and events in the environment, including specific features of the latter which are arranged to habituate him (through punishment, social approval and disapproval, etc.) in the manners and customs of the group. He has a multitude of things to learn; the most difficult of these is an effective, wholesome, satisfactory working-arrangement between his interests, desires, impulses, and emotional reactions on the one hand, and the demands and limitations placed upon him by his abilities and the circumstances of life, on the other. He desires many things which he cannot attain immediately; he is also likely to want many things which he can never attain. He must continually modify desires and achievement to bring them into harmony. He needs to learn through first-hand experiences his own capacities and limitations, as well as some knowledge of real life. Book knowledge and second-hand information of one sort or another will not suffice. He has

to learn to get along with others. He needs to form the habit of facing reality without undue emotional disturbance, and of trying with reasonable persistence to attain his purposes. Furthermore, it is highly desirable that he develop strong interests in many wholesome activities.

The happy solution of these problems of adaptation is often complicated by unwise parental control, by poor physical surroundings, by meager opportunities for play, by poor nutrition, by vicious companions, by schools having narrow, limited facilities, or inadequate conceptions of their task, and by other similar conditions.

Mental hygiene of childhood. The problems of the mental hygiene of childhood arise in the process of making needed changes in the instinctive and emotional responses. They center about the fundamental tasks of securing necessary habituations without crushing initiative and spontaneity, or building up other ineffective modes of response. Childhood should be happy, and free from worries and fears. Ample opportunity is needed for play, for constructive activities, for group enterprises, and for individual freedom, but all under properly controlled conditions. All influences affecting the child are to be considered. The major portion of the child's waking hours are spent out of school. Conceiving mental health broadly as a condition under which the individual attains and maintains satisfactory human relationships, we recognize the great importance of out-of-school influences. Many phases of these have been considered already in the chapters on moral development, personality, and disturbances of personality, so that little more need be added now.

Wise guidance and control during the years of pre-adolescence aid the child in building up independent self-control free from morbid fears, worries, or emotional conflicts, and enable him to preserve his initiative and spontaneity at the

same time that he is being habituated to the necessary conformities in conduct.[1]

Adolescence marked by faulty adjustments. We have previously cited (Chapter XV) a few cases of adolescent behavior difficulties. Accordingly, we present only one other case which throws much light on the problems of mental hygiene during the teens. We summarize Harrington's [2] account:

A Jewish boy lived in a congested tenement district in New York city with his father, mother, and older sister, all of whom lacked emotional balance. The father had a violent temper and was a veritable tyrant in his dealings with the rest of the family. The boy was unstable, timid, easily frightened, possessed a violent temper, was industrious, intelligent, affectionate, and conscientious. His adaptive difficulties manifested themselves when he was thirteen or fourteen years old in a marked irritability, disobedience, dissatisfaction with school and a desire to quit and go to work, and in stealing things from his father to sell. His father would not allow him to quit school and go to work. He was very harsh with the boy. The boy regarded stealing from his father as one way of opposing his authority and at the same time it gave him money to attend the theatre, a thing he greatly enjoyed. Being timid and easily frightened, he worried over the consequences of stealing from his father. He greatly feared "being sent away." He became afraid of people who looked at him on the street, fearing they were shadowing him. He was afraid to leave a theatre when the lights were on lest some one might be looking for him, see him, and make him prisoner. The boy at this time said, "I was afraid they would catch me but I couldn't stop. I had the habit. I tried to stop; it forced me back again to take some more. I felt nervous when I didn't take anything. When I took something, I felt rather better, and when I went to the theatre and spent the money, I felt better still."

Finally, fear of his father and of the possible consequences of his stealing led him to run away from home after taking a watch from his father's desk and pawning it. After a few days, driven by cold,

[1] For a discussion of principles of control, see Chapter XVIII.

[2] See *Mental Hygiene*, vol. 4, pp. 366–76.

hunger, and fatigue, he came home at night; but, afraid to go to his own room, he lay down in the corridor; here his family found him asleep the next morning. He was so overcome with fear and shame that he could not face his father, but asked permission to go to the next room so the door would be between them while his father questioned him. "The average parent in such a case as this, would probably have treated his son with a good deal of gentleness and consideration. This boy's father, however, gave way to a violent outburst of temper — threatened to choke him and said he would have him locked up." The boy, greatly alarmed, soon ran away again. A new set of complications ensued. He falsely admitted drug addiction, hoping thereby to excuse his behavior. He felt so ashamed of his conduct that he became seclusive, remaining at home shut up in his own room to avoid other people. He became more tense and irritable. He finally came under psychiatric care at a hospital. "He manifested a good deal of shame and remorse in regard to his own misdeeds; frequently he would choke with emotion and his eyes would fill with tears. Notwithstanding the difficulties he had had with his father and sister, he showed no resentment toward them and never attempted to blame anyone but himself." After four months in the hospital, during which his family moved to a different neighborhood, he secured his working papers, went to work, and succeeded in getting along fairly well at home.

"Now the cause of this boy's psychosis . . . was his failure to adjust himself to the new emotional forces that became active with the onset of adolescence. But why should he fail thus miserably in making an adjustment which most boys are able to make successfully? The fault lay primarily in his own personality — his hyperexcitability and lack of self-control, in the weakness of character that predisposed him to react to his difficulties in an unhealthy way. But much also depended on external circumstances — the treatment he received from his father, the unwholesome environment that made the task of adjustment unnecessarily difficult. There is little reason to doubt that if he had been properly handled from the first, the history of his case would have been quite different."

Developments in child psychology and mental hygiene during the eight years since the preceding case was reported

would lead many to place even greater emphasis upon the part played by the vicious home conditions surrounding the boy from his early childhood.

Essentials of a mental-hygiene program for adolescents. A program of mental hygiene for adolescents, like any other program relating to human beings, must be flexible enough to permit the modifications and adaptations necessary to meet the individual needs of every boy and every girl in the teens. Conservation of mental health during these years presupposes also ample provision for physical well-being, as discussed in the first section of this chapter. Furthermore, there are nine additional items which we believe belong in any program designed to build up and preserve the mental health of adolescents. Briefly, these essentials are as follows:

1. *Work — a variety of wholesome, useful activities.* Work is of fundamental importance for mental health; its value can hardly be overemphasized. Every youth needs and has the right to be habituated to work suited to his capacities. According to Ruskin, "Life without labor is a crime." Not only does a social obligation rest upon every individual, regardless of wealth or social position, to make (through useful work) some payment on the debt he owes for the social heritage he enjoys (see Chapter XI), but the development of self-reliance, self-respect, strength of character, and unselfishness is fostered by work. The individual out of work (not working) is out of life. Experience of real life comes through work. The youth who has nothing to do, and who spends much of his time in idleness, is not being trained to attain and maintain satisfactory human relationships. He is in great danger of forming bad sex habits; he also lacks the zest of life because his attention is turned too much inward upon himself, his feelings, and his impulses, rather than outward to overt achievement. Under such cir-

cumstances he cannot develop a strong, vigorous, wholesome, effective personality.

Common observation and the experience of practitioners in the field of medicine and mental hygiene alike attest to the value for mental health of work, as the following data indicate:

S. A., a boy of nineteen, quit school at the age of thirteen. During the past six years he has been usefully employed less than six months and has spent nearly all of his time in sheer loafing. He has one chum, a young fellow as shiftless as himself. He does not get along with those his own age although at eleven and twelve he did get along with boys, especially in games of various sorts. He is disliked by younger folks and regarded as vicious by adults who know him well. He cannot hold a job, even as errand boy at a down-town store. He is obsessed by sex ideas and has bad sex habits. He has been known to break into buildings, although he has not come definitely into conflict with the police. He has stolen from an indulgent grandmother who upbraided him but without effect.

Dr. Cabot, of the Harvard Medical School, has set forth the value of the four things — work, play, love, and worship. Discussing the value of work in attaining or regaining mental health, he says: [1]

The nervous sufferer or the chronic invalid is often no more to blame for his selfishness than for the pitiful meagerness of his muscles. The long and the short of it is, he is not nourished; his vitality has been emptied out. *Till he gets back into life he cannot help staring at the four blank walls of his narrow self.*[2] But to get back into life, or to get into it for the first time (as many women have to), is practically what work means. For the world is primarily a working world. From the insects to the angels, creation hums with work, and through work fits us for play. . . . Deprived of work, people exhaust themselves like crazed animals beating against their bars, even when the cage is of their own making.

Many a person has become neurotic or delinquent through having nothing to do.

[1] Cabot, Richard, *What Men Live By*, pp. 12–13. [2] Italics ours.

A program of work, including opportunities and stimuli to social experiences and to coöperation with others, is valuable for several reasons, particularly because it provides breadth of experiences, gives a sound basis for developing interests, and furnishes actual materials upon which the adolescent's critical tendencies may work.

2. *Play and other recreational activities.* The adolescent craves recreational activities; his nature demands them. He needs them not only during the teens but during adult years as well. A broad program of wholesome activities is of inestimable value for his mental health. While engaged in them he has no time to be moody, or introspective or to center his attention upon himself, but must meet directly and at the moment the demands which they make upon him, or else feel the displeasure of his comrades. Through such a program he has many valuable social experiences, learns much of the "give and take" of getting along with others, and comes to know the value and satisfaction of coöperating with others in group enterprises at the same time that he is becoming accustomed thereto. Of course, recreational activities should be wholesome, and should not interfere with physical health.

3. *Balance between work and play.* The adolescent has to learn to preserve a proper balance between work and play, between his tasks and his recreations. Play puts him in condition to work. Work likewise prepares him for play. The proper proportion of work and play is a prerequisite to greatest efficiency in one's task. Either extreme is undesirable, because neither one is conducive to mental health and vocational efficiency. The youth who is a grind, continually spending nearly all his waking time at his books or other tasks, is making poor preparation for adult life and has at the same time a one-sided existence. It is true that "All work and no play make Jack a dull boy," at least to the extent

that he seems stupid in many important respects. He certainly is less effective in his work than if some time had been given to recreation. Likewise the youth who spends all his time loafing, or engaged in play or other recreational affairs, is being trained to make a sorry mess of his life. Accordingly, keeping to the golden mean, avoiding excess of the one thing and deficit of the other, is as valuable to-day as in the days of Horace. What the golden mean is in any particular case is an individual matter.

4. *Useful ideals, purposes, and interests.* Strong, wholesome interests, ideals, and purposes have positive value both for the youth's achievement and for his general mental health. Possessing dominant purposes, he is in little danger of drifting aimlessly, the victim of every passing impulse. Furthermore, he has some means of resolving the conflict of impulses and desires which is inevitable during the teens. We believe McDougall's point is well taken. He says: [1]

> Happy the man whose character has been formed from a well-balanced disposition under the influence of unquestioned ideals and of a definite supreme goal or master purpose. His self-respect and the ideals to which he is attached (i.e., for which he has acquired abstract sentiments, the moral sentiments) will supply him with dominant motives in all ordinary situations, motives strong enough to overcome all crude promptings of his instinctive nature; he is in little danger of becoming the scene of serious enduring conflicts; especially is this true if he has learned to know himself, has learned by reflection and frank self-criticism to understand, in some measure, his own motives, and has formed a sober, well-balanced estimate of himself, of his capacities, his purposes, and his duties.
>
> Comparatively few men attain to such harmonious integration of character. In this modern age we no longer grow up under the influence of some one well-defined moral system supported by the authority of unquestioned religion. In all the countries of western civilization, and more so perhaps in America than elsewhere, the child finds himself surrounded by odds and ends of moral and reli-

[1] McDougall, Wm., *Outline of Abnormal Psychology*, pp. 216–17.

gious systems, Christian piety and pagan hedonism, Fundamentalism and Modernism, Christian Science and Mechanistic Neo-Darwinism, monogamy and polygamy, free love and birth-control, the popular misrepresentations of Freud's teaching, and the cult of self-expression and the Overman; winds of doctrine come to him from Emerson and Walt Whitman, Buddha and Confucius, Bernard Shaw and Omar Khayyam. Even such old anchors as patriotism begin to drag, as he is taught that love of country is an irrational prejudice, a pernicious obstacle to universal justice and to the cosmopolitan ideal. And, if he seeks to choose an ideal goal of service to which he may dedicate his life, which way shall he turn? He hears that religion is no longer intellectually respectable, nationalism is wicked, politics villainous, business corrupt, education futile, and science subversive of men's higher hopes.

In such a world crime and divorce increase alarmingly, children grow scarce, the family disintegrates, and young men ask, "Is life worth living?" Add to all this that a large proportion of adults are engaged in occupations intrinsically uninteresting and unnatural, occupations which yield little satisfaction other than the pay-envelope, and it is easy to understand that serious moral conflicts are frequent and neurotic disorders a common scourge. For men lack those dominant ideals and purposes which develop strong character and which alone can resolve the conflicts of motives that inevitably arise from time to time in all men.

5. *Effective habits and skills.* Many specific habits and skills enable the adolescent to do his work more effectively and meet his recreational demands more adequately. They also free him from the strain and stress of needless bungling and failure. Success is a positive factor in mental hygiene; failure is negative. Other habits are important, however, besides the specific ones involved in daily tasks, and to some of these we now call attention. Orderly association [1] is an important one, since it enables the youth to avoid much confusion and conflict due to interference. Attention to the present task, facing reality frankly without undue emotional stress, and getting along well with others are

[1] See Burnham, *The Normal Mind*, chaps. 16 and 20.

additional ones of great value. The reader can readily prepare an extensive list of habits whose acquisition would be conducive to the mental health of adolescents.

6. *Suitable freedom from fear, worry, and shock.* Fear, worry, and shock often interfere with the youth's mental health, and yet under the best of circumstances they will be met. Real life makes adults all too familiar with them. Many students of human nature hold, and rightly we believe, that the adolescent should be inured to them in some degree as part of his preparation for adult life; but they should not be too overwhelming, and the youth should be stimulated to meet them without unfortunate results to himself. A useful habit is that of analyzing situations which needlessly provoke fear or worry to see the futility of such weak and inappropriate responses.

7. *Freedom and responsibility.* The desire for greater individual freedom and initiative, so characteristic of adolescents, is often overlooked by those dealing with them, and results in so much needless friction that its importance can hardly be overemphasized. The youth needs all the freedom he can use wisely. As he gets older and learns how to use it, he needs more and more of it. Freedom does not mean absence of control, but rather, that the youth is given opportunity to order his own actions to accomplish results for which he is held responsible. He needs to be thrown more and more on his own resources, to set up his own purposes, and to plan and initiate activities to accomplish them. Only thus can he become self-controlled and self-directed; but wise guidance is needed. He needs the benefit of mature judgment and experience. The criterion is all the freedom he can use wisely, or at least with some profit and no harm; the actual amount in any case depends upon the youth, his previous training, his parents, and the environment.

8. *Sympathetic, firm, even, just, and rational treatment.*

The adolescent needs sympathetic understanding. Through it he is steadied and freed from many needless conflicts. He also needs that firm, even, rational control which habituates him to orderly procedures. Likewise, he should be treated fairly and justly. Unjust treatment is resented, rankles for a long time, causes much worry and strain, and lessens his respect for those responsible for it. It is an insult to dawning manhood and womanhood, and is resented so keenly as to be a frequent source of serious insubordination or open rebellion. If, however, control during pre-adolescence has been autocratic, rigid, and unfair, and the child has been so overwhelmed by it as to be forced into submission, we should not delude ourselves by thinking that all is well with him and that no harm has been done. Nothing is farther from the truth. Such a serious violation of a fundamental law of learning, the law of effect, would be expected to entail serious consequences, and one or the other of the following results is probable: first, he may submit openly for the time being, but either firmly resolve that when he gets older he'll do as he pleases, or he may do forbidden things secretly, becoming habituated in deceit; or second, if he really does submit, his spirit is broken, and his personality is maimed for life.

Under ideal conditions the child is given more and more control of his own affairs, is sympathetically guided to effective ways of handling them, and is held steadily and firmly to making reasonable achievements.

9. *Self-reliance and self-control.* The value of self-reliance and self-control for mental health is readily seen upon reflection. Self-reliance comes through success. It is not developed by an unbroken series of failures. Meeting situations satisfactorily (i.e., successfully) is a powerful stimulus for both children and adults to put forth greater effort. Failure, not due to loafing or lack of effort, is a disintegrating influence with which the young child should have little con-

tact. As he gets older he will find things he cannot do, but he is likely to have little interest in trying to do them, unless forced by some form of social pressure. Accordingly, he is not bothered much by them, and easily preserves his self-respect. Trying to do things clearly beyond one's powers is not educative; nor does any positive value attach to mere trying. Persistent effort at interesting things, or to achieve desired results within the range of one's ability, and the resulting success, are of high value for mental health. Of course, the youth learns something of his own capacities by attempting things he cannot do; but if they are attempted upon his own initiative rather than under external pressure, little danger to his mental health is imminent.

Lack of self-control a disintegrating force. Undisciplined impulses and uncontrolled emotions are a common cause of adolescent conflicts, as we have seen in Chapter VIII. Many behavior difficulties arise from the youth's inability to direct and control his own activities wisely. Self-denial of the immediate and attractive so as to attain the remote and more valuable — the subordination of the lower to the higher — is a virtue incompatible with a consistent "never-thwart-or-repress" program of child guidance and control.

That many of these essentials are mutually related and cut across each other at many points is quite obvious, and is, in fact, quite to be expected. The more one considers them the more is one led to conclude that mental health is not a free gift of Providence, but an attainment, an individual achievement of prime importance.

Provisions for mental hygiene by the agencies dealing with adolescents. What provisions for mental health can be made advantageously by home, school, church, vocation, and the other agencies or institutions having many contacts with adolescents? The limitations of space permit brief reference to only a few of the important items suggested by

an application of the nine essentials just discussed. The list can readily be extended.

The home. It is well known by workers in mental hygiene that many adaptive difficulties of adolescents are magnified by bad home conditions. Parents who are unsympathetic, who constantly nag the child and are always complaining, exert an undesirable influence upon him; likewise those who treat him harshly or unjustly, who disparage or undervalue his personality (see, pp. 487–89, the case of a sensitive girl whose mother called her "funeral face"), or unnecessarily expose his real faults, are doing him a great disservice. Weak and overindulgent parents often coddle the youth, give him his own way in everything, free him from all responsibility, try to anticipate his every wish, and habituate him in not doing things for himself or in doing nothing useful. Naturally he does not get along as they desire. Much of the meaning of life depends upon what is done with it, or how it is employed; its value is largely determined by the same thing. On the other hand, domineering parents may so overwhelm the youth as to keep him timid, shy, dependent, and lacking in self-confidence long after the time when he should be independent, self-controlled, and self-reliant.

Proper home conditions allow ample freedom under circumstances of responsibility and guidance adequate to his needs, and provide a wide variety of useful tasks and wholesome recreational activities. Broken homes, and those characterized by much wrangling, especially quarreling between parents, have undesirable effects upon adolescent boys and girls, as do also those homes in which the youth and his problems (to him really serious) are treated with derision, condescension, or contempt. Parents usually forget the majority of their youthful problems and difficulties. They are in danger of losing sympathetic contact with their adoles-

cent sons and daughters and of finding their influence over them feeble indeed. A young high-school girl in good physical health had been leading her class in her studies, but she began to fail in Latin and mathematics and was doing poor work in the others. Inquiry revealed that she was disturbed by the lack of freedom to do harmless things on her own initiative. Asked what she did when she studied her lessons she said, "Oh, I think of the things mother won't let me do."

A case of wise home control. Many cases of effective home training come under the observation of high-school teachers and others dealing with adolescents, but very few of them are reported in the literature. Usually cases of bad home conditions are presented instead. Accordingly, we give here a brief account of a boy whose home training during adolescence illustrates many desirable features.

G. B. graduated from high school at eighteen, began prolonged, active service the following year in the field artillery in France, and is now a successful young business man. His adolescence seemed as normal and prosaic as possible; there was nothing bizarre about it. He easily resolved all the conflicts of the teens. He was a vigorous, stocky, healthy, happy, even-tempered, self-controlled, quiet, fearless boy. His school work was fair or good. He had no subject failures. He was on the football, baseball, basketball, and track teams in high school. He got along well with people and had many friends.

His father, a Scotchman of powerful physique, was in business, but found some time to be his children's companion in activities they enjoyed, but not to the exclusion of children their own ages who found great pleasure, even on through adolescence, in the cheerful welcome and happy, well-ordered freedom of G. B.'s home. He was a quiet, reserved, undemonstrative, cheerful, even-tempered man; yet a strong bond of sympathy existed between him and his children. He did not coddle them. He and G. B. boxed from the time the latter was a little lad. During his high-school days G. B. put up a good fight, and he and his father were accustomed to hitting hard. On occasion, G. B. would land a blow with all

his force, and on occasion would be knocked down. But never in anger; always according to the rules.

G. B. played end on the football team. In a game with an Indian team composed of much older and larger players, G. B. tackled an Indian at least forty pounds heavier and five years older than himself, as the Indian circled his end; but the Indian in some manner gave him a push, throwing him so hard that he didn't get his breath for a few seconds. The father, on the side lines a few feet from where G. B. fell, watching intently, saw that he had no serious injury, and called out as the crowd was hushed through fear that the boy was hurt, "You let that Indian do that again, G. B., and you're no son of mine." On the next play the Indian tried to repeat his performance, but G. B. tackled him so hard and held so firmly that he brought him down, whereupon the father shouted, "That's the stuff; now you're playing." Yet in case of accident or injury the father would have secured at once the best medical care.

Control was even, fair, free from violent emotional outbursts, allowed much freedom for G. B. to direct his own affairs, yet helped him when he needed help.

The school. Much of the mental hygiene program of the secondary school [1] naturally centers about schoolwork and recreational activities, because they occupy most of the student's time. While everything the school does and all that pupils do in connection with the school have significance for students' mental health, attention should be directed to certain very important specific considerations.

(*a*) *Variety.* A broad program of activities is valuable both for breadth and interest as well as to serve the try-out, or sampling function of the earlier years of high school.

(*b*) *Methods of work or study.* Training in effective meth-

[1] Although a million adolescents are now enrolled in elementary schools, yet the secondary school really is the unit of our school system designed primarily for them. Better curricula in the elementary school, differentiation of requirements according to capacity, better methods of teaching, and closer coöperation of parents with the school should reduce their number. Elementary schools enrolling youth in the teens have, nevertheless, the difficult but important task of trying to meet their needs.

ods of work is advantageous because it enables pupils to accomplish more, and gives them more of the stimulus of success at the same time that it develops self-reliance and independent effort.

(*c*) *Alertness to adaptive difficulties.* Adaptive difficulties arise in high school. Provision for their early detection and proper treatment should be made by the high school through appropriate organization and administration. Constant alertness of teachers is needed. Many times the teacher can help the pupil overcome the difficulty or remove its cause. Other cases require the services of a competent psychiatrist or properly trained psychologist.

(*d*) *Psychiatric service or clinics for behavior cases.* Some high schools are finding it helpful [1] to refer difficult cases of maladjustment to a clinic, through which diagnosis and treatment by a competent psychiatrist may be secured. This is a sound procedure, which is likely to become more common as its value is demonstrated and the public becomes aware of the need for it. Preventive work in schools and in the vocations is much more effective than corrective work in hospitals and sanitariums, after the adaptive difficulties have become serious.

(*e*) *Work proportionate to ability.* The adolescent in school is expected to spend much of his time working. He needs to become accustomed to hard, persistent, concentrated effort, but the tasks should be suited to his capacity so that he may know the joy of having success crown his efforts. The abilities of high-school students differ greatly: therefore, the demands of the school need to be differentiated as widely as administrative exigencies permit. Failure to adapt the re-

[1] See, for example, Bingham, "The Application of Psychiatry to High School Problems," in *Mental Hygiene*, vol. 9, pp. 1–27; Greene, "Results of Five Years' Psychiatric Work in New York City High Schools"; in *Mental Hygiene*, vol. 11, pp. 542–57.

quirements to individual abilities means that some students meet the school's scholastic demands very well without much effort and tend to form habits of idling, whereas others, working very hard, receive poor marks or fail. While it may be argued with some degree of plausibility that the high-school student who does not meet a certain absolute standard should fail regardless of how hard he has worked, since this is the way of the world of real life, yet we must look at the problem in another way.

If we allow students to attend high school, and if we accept the "try-out" function, are we not obligated to offer such a wide variety of useful courses that each student by hard work can succeed at something of value? To do this entails wider offerings and more adaptations than are found in most high schools at the present time. If it could be shown that no useful [1] courses can be arranged which are suited to the capacities of the less able high-school students, then it would seem to follow that such students do not belong in high school. The offerings of various "vocational," "trade," and other similar schools indicate that useful courses can be found for practically all who enter high school, although the financing of such a program is another problem.

We are not interested now in the details of such courses, or their relation to college entrance, or the host of other complex administrative problems, but rather in that arrangement of school demands in accordance with capacity by which we may conserve and promote the mental health of adolescents. Some plan of grouping together pupils who are homogeneous in ability and achievement, or of varying the assignments according to individual needs, is being used successfully in many high schools.[2]

[1] Useful in the broad sense that other courses are useful and entitled to a place in the high school.

[2] See Chapter XVIII.

(*f*) *Mastery.* Having assigned school tasks in accordance with pupil capacity, the high school's next fundamental objective is to see that each pupil really does master some things. This means that the differentiation of requirements in proportion to the students' capacities relates to the amount or difficulty of the subject matter rather than to the degree of mastery. We recognize, of course, that some subject matter may be in a course for general informational purposes and that some familiarity with it is all that may be needed for appreciation, background, etc.; but, at the same time, other materials in a course are to be mastered. We are inclined to believe that incorrect notions of irregular French verbs, wrong ideas of Latin syntax, inability to read simple selections in a foreign language, defective skill in typewriting and shorthand, or a similar smattering of any other subject has a cultural value which, if appreciable, is indeed small. Mastery gives a joy, a self-confident outlook, and a predisposition toward achievement whose value for mental health is as great as it is for the youth's general efficiency.

(*g*) *Extra-curricular activities.* A varied program of extra-curricular activities, carefully administered so as to reach each student, is a valuable means of insuring adolescent mental health. Properly adapted to the individual needs of the students, such activities give youth opportunities of learning to work together to attain group purposes, provide wholesome recreation, center interest and attention outside the self, help sublimate impulses and desires, and train him in a desirable use of leisure.

A broad program needed. Athletics alone form only a part, although an important one, of the activities of such a program, a part whose value is greatly enhanced when they are organized and directed so as to reach all students rather than merely the few exceptional athletes. The so-called

extra-curricular activities have a definite place in secondary education and, when properly combined with the curricular activities, are a means of habituating adolescent boys and girls to a useful balance between work and play.

The church. What can the church, as a religious institution, do, or what is it doing, for the mental health of adolescents? We confine our discussion at this point entirely to matters of religion, because the activities of athletic and social clubs, of Boy Scouts, and of other similar organizations often fostered under the auspices of the church, are, strictly speaking, not a religious program at all, although churches are usually wise in encouraging them so as to provide a well-rounded program of wholesome activities for adolescents. They are justified in the eyes of many on the grounds that religion is a practical matter, and should touch the daily life of the individual at all important points. We are inclined to admit the force of this argument, and to agree that habituation in right living is an exceedingly important objective, but, at the same time, we call attention to the fact that habituation in right living is also the goal of moral or civic education. However great the divergence of views on the foregoing point may be, we believe all will agree that the one thing which truly differentiates the church from secular institutions is the fostering of religion and its influence in the lives of people. It is possible to have a fine program of social and recreational activities, as good, let us say, as those provided by our best high schools, and at the same time neglect the religious needs of teen-age boys and girls. Therefore, athletic, social, and other similar activities whose value we have repeatedly emphasized, are treated elsewhere in this volume, and we consider here the one problem — the utilization of religious activities for the mental health of adolescent boys and girls.

We conceive of religion not as a useless tool of the strong

or the refuge of the weak, nor yet as an intellectually disreputable emotional fervor, as some seem to do. We have tried (in Chapter XI) to show, both by discussion and by reference to the literature on the subject, that true religion is a great integrating force in the lives of people to whose mental balance and poise it can and often does contribute much. Two features of religious activities are especially significant for the mental hygiene of adolescence.

(*a*) *Religious teachings and doubt.* One cause of adolescent conflicts is changes in religious beliefs. If early religious instruction has given the child false notions; if the things he has been taught are petty, inadequate, or, in the light of broader experiences, false; they are likely to become a stumbling-block during adolescence when he critically reexamines and reëvaluates his ideas, beliefs, and other forms of experience. Under the best of circumstances he will have religious doubts and they will cause him trouble, but his troubles are needlessly augmented by teachings which he cannot believe during the teens. Religious ideas suited to the child are not necessarily suited to the adolescent, especially in their childish form. Provision is needed for their successive modification in accordance with his development to prevent a break at adolescence. Ideas in other fields are modified by new, deeper, or broader accretions of experience. If religion is to play its important rôle in adolescence, parallel developments not only may be expected but should be provided for, so as to avoid abrupt, cataclysmic changes.

(*b*) *Worship.* The central core of religious experience is worship. Music, ritual, and other important elements may be arranged to contribute much to the religious service, or they may actually secularize it. Joy, praise, prayer, confession and sublimation have positive value for mental health. Undoubtedly more effective use can be made of these means

than is often done. "Honest confession is good for the soul"; but its value for mental health, the thing in which we are now interested, is evidenced by its wide use by practitioners in mental hygiene. Frank recognition and acknowledgment (to one's self or to others) of faults, of conflict of desires, are implied in *facing reality*, an essential of mental health. Psychiatrists in many cases of mental ill-health induce the patient to tell of his trouble, how it began, etc., and find that such frank acknowledgment and understanding of it are important steps in effecting improvement.

The church can use advantageously all these elements of worship in its religious contacts with adolescents. Devising specific programs suited to the various denominations is not in any case an easy task, yet it is an important undertaking. While these elements have great value in the total religious life of the adolescent, we have considered here only their worth in helping him attain and maintain satisfactory human relationships, and have indicated directions in which lie the possibilities of their more effective utilization.

Vocation. Approximately as many adolescents are gainfully employed as are attending high school. The conditions and effects of their employment are of vital social significance because of their influence upon mental health and efficiency. The community's obligation in safeguarding the mental health of these workers relates to their physical well-being, already discussed in the first section of this chapter; to their social welfare, discussed in the second section; and to certain other features of employment, three of which are peculiarly significant.

In the first place, young workers should be engaged upon tasks suited to their capacities. Working at tasks for which they have little aptitude is needlessly trying, uninteresting, and discouraging, at the same time that it is economically ineffective. One important function of vocational guidance

is the conserving of human values,[1] for only thus can the developmental needs of adolescents and, consequently, the best interests of society be safeguarded. Not merely finding a person for the job, or a job for the person, but finding the best person for the job and the job best suited to the individual's capacities and interests are the aims. Vocational guidance holds the key to important achievements in the field of mental health.

In the second place, the vocation furthers adolescent mental health to the extent that variety breaks up the irksomeness and drudgery of monotony. Specialization has increased the efficiency of production, but it has made much factory work extremely monotonous, has often stifled the joy in workmanship, and has often made work mere days of drudgery to be endured solely for the weekly pay-envelope. Labor troubles are often partly due to psychological causes (usually unrecognized as such), rather than to economic causes alone. Work is drudgery, if the worker can find no satisfaction in it, or if it is not a means of expressing his abilities. Undoubtedly we need further development of those means used in many establishments to build up the worker's interest in the tasks which constitute his daily routine. There is also the possibility of increasing interest through variety of activities without decreasing production.

In the third place, the adolescent gainfully employed needs wholesome recreations. The shorter working day, and the monotony of many occupations due to specialization, have greatly increased the importance of leisure. Suitable recreational activities can be distinctly advantageous to teen-age boys and girls who have quit school and joined the ranks of wage earners.

Communities deem it worth while to provide gymnasiums, athletic fields, social rooms, auditoriums, and other similar

[1] See, for example, Proctor, *Educational and Vocational Guidance*, chap. 1.

facilities for high-school students, and employ competent men and women to direct the student activities connected with them, but there are as many adolescents not in school as there are in all the junior, senior, and other high schools (public, private, and parochial) combined. Why should they not have a chance to a similar program of worth-while activities? Many a high-school gymnasium, if open for use at night or Saturday afternoons is open for the use of high-school students only, young people at work never having any opportunity to enter it other than by paying admission to see high-school games. Similarly with social rooms and auditoriums. They are for high-school students only.

The plausible argument that those who work all day are too tired to engage in any athletic games in the evening or Saturday afternoons is essentially unsound, as any one knows who has seen the enthusiastic participation of workers when opportunities for athletic sports have been provided under suitable conditions: witness boys playing sandlot baseball, or playing on the various basketball, soccer, football, and other teams of our cities, or witness the girls taking part in basketball, bowling, etc., in the industrial leagues. Public Athletic Leagues and other similar organizations are doing fine work along this line. We can see no valid reason why the youth who stay in school during the teens should have recreational facilities provided at public expense, whereas an equal number who go to work are denied these privileges. We believe that the progress made in some cities toward providing for these important needs is in the right direction, and that it is for the best interests of youth and society to extend these privileges to the working adolescent at the same time that we provide them for those attending school. We include, of course, other wholesome recreational activities as well as athletic games.

It is interesting to note the provision made in France for

young adolescents who have quit school and gone to work. We do not have data for the years since the War, but those we have are quite suggestive.[1]

In 1910–11 there were in France 6541 Associations of Former Pupils of Primary Schools, and 1800 athletic societies of one kind or other, the majority of whose members were young adolescents. The report of the inspector general to the minister of public instruction in 1902–03 says of the work of these societies:

"One feels himself in the presence of a young new world which is being born into the customs of conscious democracy, voluntarily disciplined. . . . What spirit in the organization of fêtes, and such earnestness as follows when in the committee meeting there are considered the admission of members, the by-laws,, the internal regulations, the subject of conferences. . . . The associations of former pupils become for the working and rural adolescent the school of liberty, itself. The common purpose is to recreate, instruct, to give mutual help. . . . To-day, thanks to them, the school grounds in the better cities and villages are entirely transformed. Demountable stages and built scenery painted by voluntary workers, improvised show troupes, orchestras, choral groups, often fill with color and sound the vast classic rooms Saturday evenings and Sunday afternoons."

Other agencies. The work of Boy Scouts, Camp Fire Girls, and Girl Scouts is highly commendable, and illustrates the application of many of the principles of adolescent mental hygiene. The youth is trained to face reality, to get along with his fellows, and to form other important habits. A difficult and important problem is securing competent leaders — those who can hold young adolescents and lead them to enjoy attaining the high ideals of the organization. Other agencies making valuable contributions are the Y.M.C.A., Y.W.C.A., Y.M.H.A., K. of C., Public Athletic Leagues, many summer camps, and other similar organizations.

[1] See Brooks, "Education for Citizenship in France," in *Educational Review*, vol. 65, pp. 307–12.

The programs of various other athletic and social clubs do not always help adolescents make effective mental adjustments.[1] Under the proper direction and control they may be quite helpful, but too often they are commercial enterprises interested only in the financial returns, and surround the adolescent with conditions which are socially undesirable or even vicious.

PROBLEMS FOR DISCUSSION

1. Physical education program for adolescent boys. Differences between it and programs for men and pre-adolescent boys.
2. Physical education program for adolescent girls. Contrast it with similar programs for women and for pre-adolescent girls.
3. Comparative values of inter-school and intra-school competitive athletics.
4. What can the high school do to influence its students in matters of diet, sleep, and recreation? What can parents do?
5. What do you think of the proposal to require attainable standards of physical health for graduation from high school?
6. Dangers of overtraining high-school athletes.
7. Discuss: Health departments of schools should spend more time teaching tennis, golf, swimming, etc., which can be carried over into adult life.
8. Types of needs in the physical training of the adolescent.
9. Discuss: "We should substitute for our present system of highly competitive athletics a program involving the wholehearted participation by all students which will result in a better preparation of each individual for life."
10. The significance of malnutrition.
11. A sex education program for junior high schools; for senior high schools.
12. The work of secondary school and of home in training for parenthood.
13. The effect of the hurry and strain of modern life upon the adolescent's physical and mental health.

[1] See, for example, Thrasher, *The Gang*, pp. 232–36, 395–400.

14. The community's responsibility for the social, recreational, and health education of adolescents not in school.
15. Ways of helping the moody and depressed adolescent to adjust himself to his environment and achieve right balance in personality.
16. School treatment of the extroverted adolescent, who is self-assertive and anxious to show-off.
17. How can home and school help adolescent pupils understand themselves?
18. Does "mastery" imply a fine division of subject matter to meet each individual's needs?
19. Show how the principles of mental hygiene may be applied to the adolescent without developing in him a tendency to excuse himself from hard mental tasks.
20. The work of the teacher and of the mental hygiene expert in handling problems of mental ill-health.

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CHAPTER XVII

THE PREDICTION OF ADOLESCENT BEHAVIOR

The prediction and control of adolescent behavior are the two most important problems upon which the psychology of adolescence should give information. Having set up the objectives to be attained, we turn to the psychology of adolescence and of learning for that knowledge of development and of the modification of behavior which enables us to select the means appropriate to secure the desired changes. In the present chapter we consider problems of prediction; in the one which follows, some of the principles applicable to guidance and control.

1. *Methods of determining the predictive value of knowledge*

Any present information makes possible the prediction of some future event only if it is closely related to it in some way. If a particular event in all observed instances follows some other event, also being absent when the other is absent, we might regard the latter as symptomatic of the former. However, we would need to make further observations and analyses to guard against other errors [1] before concluding that the one event really is the antecedent from whose presence we can predict the other event.

Repeated observations needed. One instance is not enough for reliable forecasting. We may have observed, for example, that a particular boy is much more aggressive at sixteen than he was at twelve, but we could not safely conclude from the one instance that adolescence is marked by a

[1] See textbooks on Logic for treatment of inference, causation, and allied topics.

noticeable increase in aggressiveness. We would need many instances in which such a trend was found. If, however, numerous exceptions occurred, further more detailed observations would be needed so as to know the conditions under which the trend was characteristic and those under which it was not. Or, in engineering, if we studied many cases and found: (1) that no engineer had an I.Q. of less than 100; and (2) that every person having an I.Q. of less than 100 and trying to be an engineer had failed, we might conclude that a prerequisite to success in engineering is an I.Q. of 100, and this conclusion might not be greatly in error; but its complete justification would require additional investigation.[1] We would have to know: (1) that other traits necessary for success in engineering but also possessed by many whose I.Q.'s were less than 100 were actually possessed by those who had I.Q.'s of less than 100 and were failing in engineering, lest the failure be due to the lack in the *other traits* rather than to I.Q.'s of less than 100; or (2) that an I.Q. of less than 100 always meant the lack of these other traits necessary for success. We might supplement the above information by careful analysis and comparison which would show that the intellectual demands of the engineering professions implied an I.Q. of 100 or more.

The use of averages in prediction. Masses of data are hard to interpret without employing some statistical measures, such as the mean (arithmetic average), or the median (fifty percentile).

Suppose we wanted to determine the value of sixth-grade marks for predicting scholastic success (e.g., marks) in the first year of junior high school. We might proceed as follows:

[1] Much educational and psychological research is defective in this respect. See, for example, the author's "Criteria of Educational Research"; in *School and Society*, vol. 18, pp. 724–29, and other similar writings.

(1) Consider those pupils who had been in junior high school one year for whom sixth-grade marks are available.

(2) Divide them into five groups according to marks in grade six, putting in group 1 the 20 per cent having the highest marks, into group 2 the 20 per cent having the next highest marks, etc.

(3) Find the average junior-high-school marks of each of these groups. Suppose they were as follows:

Group	Av. Marks in Junior H.S.
1	86
2	82
3	77
4	74
5	70

We might conclude that, on the average, sixth-grade marks had some predictive value for marks in grade seven; but we should have to be very cautious about our inferences from such averages. If the marks of the groups overlapped much, as shown in Fig. 80, high sixth-grade marks would not

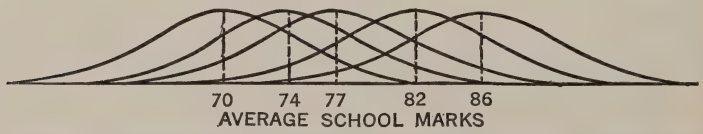

Fig. 80. Hypothetical Distributions of Marks, Showing Much Overlapping

necessarily imply high marks in seventh grade, nor would low marks always be accompanied by low marks in the succeeding year in school. If, however, there was little overlapping of the marks of the different groups, as in Fig. 81, we would have a better basis for concluding that junior-high-school marks are somewhat in proportion to those earned in the sixth grade.

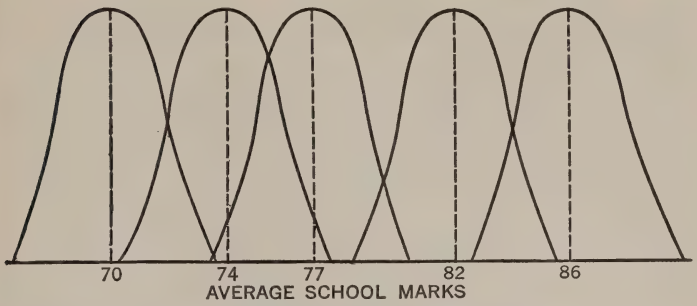

FIG. 81. HYPOTHETICAL DISTRIBUTIONS OF MARKS, SHOWING LITTLE OVERLAPPING

The use of grouping to determine predictive values. The predictive value of any factor may be ascertained by: (1) dividing pupils into two or more sections upon the basis of their scores or ratings on that factor; (2) dividing them into the same number of sections upon the basis of the thing to be predicted (the criterion); and (3) comparing the two sets of groupings to see how closely they agree. Thus the pupils who have been in junior high school one year may be divided into four sections according to their sixth-grade marks and into four sections according to their seventh-grade marks, and the two sectionings compared. If they do agree closely, then sixth-grade marks have significant value for predicting seventh-grade marks. In our illustrative case, if 75 per cent are correctly sectioned, if 20 per cent are in the section above or below the one to which they belong, if 5 per cent are two sections above or below the proper one, and if none are three sections above or below the proper one, we would conclude that sixth-grade marks have considerable predictive value for homogeneous grouping; but if only 30 per cent were correctly sectioned, 30 per cent displaced one section, 25 per cent two sections, and 15 per cent three sections, then they would have no predictive value, since by chance the per-

centages displaced 0, 1, 2, or 3 sections would be 25, $37\frac{1}{2}$, 25, and $12\frac{1}{2}$, respectively.

Correlation and regression as means of prediction. Another way of determining the value of any facts, such as intelligence-test scores, for predicting some other thing, for example, high-school marks, is to find the correlation between them. Thus we would find the correlation between pupils' high-school marks and their scores on intelligence tests given at the beginning of their high-school career. Correlation is a measure of the agreement between the pairs of ranks on the two things correlated. The more nearly alike each pair of ranks is, the higher is the correlation. In Chapter VI we briefly discussed correlation and explained the meaning of k, the coefficient of alienation, showing in Fig. 56 (page 150) a chart from which one can readily read off the value of k corresponding to each value of r (coefficient of correlation) from .00 to 1.00. The significance of r for predictive purposes, seen clearly only by considering k or by utilizing some other appropriate statistical device, also was discussed in Chapter VI. Accordingly, we need only show how coefficients of correlation may be used to estimate one trait or fact from a second one with which it is correlated. Our treatment is brief and quite elementary.[1]

Meaning and use of regression equations. If we know, for example, the correlation between mathematics and science, we can estimate a pupil's score in mathematics from his score in science, and *vice versa*. To do so, we employ the regression equations. There are two of them, as follows:

$$(1)\ x = r_{xy}\frac{\sigma_x}{\sigma_y}y$$

$$(2)\ y = r_{xy}\frac{\sigma_y}{\sigma_x}x$$

[1] For a more adequate treatment of regression, see any standard work on Statistics.

Let x be the deviation of a score in mathematics from the mean of the whole group's scores in mathematics; r_{xy} is the correlation between mathematics and science; σ_x [1] is the standard deviation [2] (mean square deviation) of the scores in mathematics; y and σ_y are, respectively, the deviation and the standard deviation of science scores from the average of the science scores of the group.[3]

Problem. The correlation between mathematics and science is .80 for a group of high-school pupils; the mean mathematics score is 70; the standard deviation of the mathematics scores is 4.0; the science mean is 85; standard deviation, 5.0. Suppose a pupil's score in science is 75; what is his probable score in mathematics?

We may indicate these facts in the symbols of our regression equation by rewriting them as follows:

$$r_{xy} = .80$$

$$\text{Mean}_x = 70 \qquad \text{Mean}_y = 85$$

$$\sigma_x = 4.0 \qquad \sigma_y = 5.0$$

To find x.

We use formula (1),

$$x = r_{xy} \frac{\sigma_x}{\sigma_y} y$$

$$y = 75 - 85 = -10$$

Substituting in (1), $x = .80 \dfrac{4.0}{5.0} (-10)$

$$x = -6.4$$

$70 - 6.4 = 63.6$ (that is, 64), the estimated mathematics score.

[1] Read "sigma of x," or "the standard deviation of x."

[2] See any textbook on Statistics.

[3] Regression equations are used also in the "score" form, to estimate the gross scores. We present the "deviation" form of these equations and estimate scores as deviations from the means of the groups. The "score" form is easily obtained from the "deviation" form by the simple process of moving the origin the amount of the mean, as treated in plane analytic geometry.

Explanation. The pupil's science score of 75 is 10 less than the class average of 85; that is, $y = -10$. Substituting in formula (1), $x = -6.4$; that is, the pupil's probable mathematics score is 6.4 points below the class average in mathematics; accordingly, we have 70− 6.4 = 63.6 (or 64) as the probable mathematics score corresponding to a science score of 75.

In similar manner we would estimate each pupil's science score from his mark in mathematics, using formula (2). As we have seen in Chapter VI and from Fig. 56, predicting scores in one subject from a knowledge of scores in another subject, which correlates .80 with it, is 40 per cent more accurate than guessing, since the corresponding coefficient of alienation is .60.

Correlation data from repeated investigations needed to show the limits within which the probable accuracy of prediction lies. Suppose investigation showed: (1) that mathematics and science correlated .72 in Grade XI in one high-school class of 64 pupils, and (2) that they correlated .65 for 750 pupils of Grade XI in ten high schools. Which coefficient more closely represents the one which would be obtained if all Grade XI pupils of all high schools were considered? Obviously, .65, because it is based upon a larger number of cases and upon pupils from many more schools. The larger the sample, the smaller is the probable error of the coefficient of correlation. As we have shown elsewhere,[1] the probable error of a measure shows its reliability merely in respect to the size of the sample and the chance errors of sampling. It tells us nothing about how typical the sample is of the total group from which it is drawn.

Repeated investigations are needed if we would know the limits within which the accuracy of prediction lies in any case. If, for example, ninth-grade mathematics correlated .60 with tenth-grade mathematics in the case of 2500 pupils,

[1] *Op. cit.*, p. 727.

the P.E. (probable error) of this coefficient would be .009; from this we might conclude that the correlations from practically all schools would lie between .564 and .636 (.60 ± 4 P.E.); and they would, if all the other samples were in all essential respects like the one of 2500 cases. As a matter of fact, however, smaller samples from one or two high schools are not likely to be like the larger one. The correlation from a class of 80 pupils from one school might be .65, and from another class in the same or from a different school it might be .70, depending upon factors other than the number of pupils in the group. Accordingly, many investigations are needed to show the range of correlations from many different schools and classes. Or, any one school would need to find out the correlations for more than one year or class. From such a mass of correlation data may be known the limits within which the correlation in any case is likely to lie.

Fifty coefficients based upon 30 to 100 cases each and representing many schools and classes would give a more adequate knowledge of the value of ninth-grade mathematics for predicting tenth-grade mathematics than the one coefficient of correlation which could be calculated from the combined data from all the schools; because the 50 coefficients do show the range of the ones obtained under the varying conditions of selection and of other factors from one school to another, and hence the probable limits within which others are to be found; whereas the one coefficient is not necessarily the same as the average of the fifty, nor does its P.E. bear any known relation to the limits within which lie the fifty coefficients or those from any other schools or classes.

2. *Predicting physical and motor development*

We have already seen (Chapter VI) that height at ten or twelve is closely related to height from one to six years later,

and that weight, strength, and a few other traits show similar high correlations. (See Chapters VI and XIV.)

3. *Predicting intellectual development*

Physical status not an accurate index of intelligence. We have previously pointed out (Chapter VI) that knowledge of a boy's height, weight, strength, ossified area (or ratio) of wrist bones, physiological age, or any other physical trait thus far carefully investigated cannot be used to give estimates of his intellectual status. Estimating intelligence from physical status is not likely, on the average, to be even five per cent more accurate than guessing. We can, however, predict reasonably well an adolescent's intellectual development from a knowledge of his intellectual status, since we know (see Chapter V) that Stanford-Binet intelligence examinations, repeated after intervals of four or five years, yield I.Q.'s differing from those on earlier examinations by amounts having a probable error of four or five points. I.Q.'s from group tests tend to fluctuate more than those from an individual test like the Stanford-Binet; but this is due either to the tests, or to the group method of administering them, since the degree of intelligence remains nearly the same at thirteen and at eighteen, barring accident or disease which might affect the central nervous system. The best means now available for predicting the possibilities of an adolescent's intellectual development is a good intelligence examination.

4. *Predicting moral and religious development*

We cannot forecast adolescent moral and religious development accurately. The few useful means of measuring such traits have not been used long enough for the accumulation of data showing their predictive value. What little we know is based upon some detailed repeated observations

and upon certain *a priori* considerations, but it is tentative and subject to modification once precise means of appraisal are used. Many specific moral habits show considerable persistence from childhood into adolescence, and indicate a continuity of development analogous to that in the case of intelligence; but we have no data showing how precisely moral development can be predicted even two or three years in advance.

5. *Predicting success in high school*

School success really refers to all those things which we set up as the objectives of the school; it includes the development of the youth physically, mentally, morally, and socially. We confine our present discussion to scholastic achievement, an objective which occupies so much of the secondary school's time and attention. Three criteria of success are: (1) the length of time pupils remain in school, (2) the high-school marks assigned by the teachers, and (3) the scores on suitable standardized tests. We shall consider each of these criteria in order, presenting data on the third one in discussing the prediction of achievement in the various high-school subjects.

Persistence in school and graduation. Certain factors are related to persistence in school and age of graduation, as follows:

1. *Age of entrance a factor.* The younger a pupil is at entrance to high school, the greater seem to be his chances of graduating. A pupil entering the ninth grade at the age of twelve or thirteen has nearly three times the chances of graduating from the twelfth grade as the pupil who enters at the age of sixteen. (See Tables 40 and 41.) [1] This is not

[1] Some of the data of these tables are taken from studies made by the following graduate students working under the author's direction: R. E. Brasure, C. A. Crandall, C. E. Johnson, L. Laughlin, S. C. Stull, and Leita Twining.

TABLE 40. AGE OF ENTRANCE AND PERSISTENCE IN HIGH SCHOOL
N = 1266

AGE OF ENTRANCE	NO. ENTERING	GRADE REACHED WHEN QUITTING SCHOOL				GRADUATED (per cent)
		IX (per cent)	X (per cent)	XI (per cent)	XII (per cent)	
11	5					100.0
12	26	7.7	3.8	7.7	7.7	73.1
13	181	9.4	10.5	6.6	4.4	69.1
14	516	8.1	16.9	11.6	6.6	56.8
15	366	11.3	19.1	12.3	8.7	48.6
16	133	13.5	26.3	15.8	8.3	36.1
17	31	12.9	22.6	19.4	12.9	32.3
18	8	37.5	12.5	25.0	0.0	25.0
Total	1266	10.0	17.4	11.7	7.2	53.7

TABLE 41. AGE OF ENTRANCE, WITHDRAWAL, AND GRADUATION FROM HIGH SCHOOL
N = 2546

AGE OF ENTRANCE	NUMBER ENTERING	NUMBER WITHDRAWING	NUMBER GRADUATING	PER CENT WITHDRAWING	PER CENT GRADUATING
12	26	4	22	15.4	84.6
13	317	83	234	26.2	73.8
14	786	279	507	35.5	64.5
15	796	403	393	50.6	49.4
16	435	262	173	60.2	39.8
17	149	105	44	70.5	29.5
18	37	28	9	75.7	24.3
Total	2546	1164	1382	45.7	54.3

surprising. The older pupil often feels out of place with the younger ones; then too, economic pressure, the lure of the job, and other similar conditions cause many others to leave school within one or two years. Age of entrance to high school, however, is itself the result of several more fundamental conditions. Obviously, pupils who do the work of eight years in six years, and enter ninth grade at the age of

twelve, have very good mental ability. It is equally clear that pupils who are in normal health, attend school with reasonable regularity, but need ten years to complete eight years' work are overage at entrance to high school because they have less mental ability. Irregular attendance, often an alleged cause of failure, is frequently the result of the student's inability to do the work required of him. Of course, overageness is sometimes caused by the pupil's not starting to elementary school until he is eight or nine years old, by shifting from one school to another on account of his parent's frequent movings, by his quitting school for economic reasons and later reëntering, by prolonged absence due to illness, and by other similar conditions, but such cases constitute a very small proportion of the overage group. Overageness is more likely to be a symptom of indifference toward school work, or of such mental ability as renders it difficult or impossible for the pupil to meet the scholastic requirements of the high school.

2. *Relation of intellectual ability to persistence in school.* Not only does inferior mental ability cause overageness, and thus result in earlier withdrawals from high school, but it also causes pupils to fail in their school work, become discouraged, and quit school. Franklin's [1] data show that one fourth of an entering group of junior-high-school pupils left school within twelve months. (See Table 42.)

The chances of a pupil's being eliminated during the first calendar year in junior high school seem to be four times as great if he is among the lowest thirty per cent in intelligence as they would be if he were in the top thirty per cent of the group. Other data confirm these results. The greatest amount of withdrawal is likely to be found among those pupils who possess smaller amounts of the abilities measured

[1] *The Permanence of the Vocational Interests of Junior High School Pupils,* chap. 9.

TABLE 42. THE RELATION OF INTELLIGENCE TO ELIMINATION OF PUPILS FROM THE JUNIOR HIGH SCHOOL
(Franklin)

INTELLIGENCE, DECILES	ELIMINATIONS DURING ONE-YEAR PERIOD					
	Number			Percentage		
	Boys	Girls	Total	Boys	Girls	Total
1	6	0	6	7	0	4
2, 3	35	18	53	22	13	18
4, 5, 6, 7	51	36	87	19	11	15
8, 9	74	57	131	58	35	45
10	47	41	88	70	51	60
Total	213	152	365	30	20	25

by existing mental tests. Since pupils upon completing the elementary school usually are automatically admitted to high school, the latter faces difficult and important problems of providing useful courses suited to the capacities of those entering therein, and of giving them effective educational guidance.

3. *Parental occupation and persistence in high school.* A definite relationship seems to exist between the father's occupation and the length of time the child will stay in school. In the cities, children whose parents belong to the non-labor groups (professional, commercial, managerial, clerical, proprietor) are much more likely to remain in high school until the senior year than are the pupils whose fathers are miners, lumber-workers, fishermen, common laborers, or are engaged in personal, public, agricultural, or transportation service, or in the printing, building, and machine trades.[1] In the smaller towns and in rural communities children whose parents are engaged in agricultural service, the building trades, or common labor are likely to persist longer in high

[1] See Counts, *The Selective Character of American Secondary Education*, chap. 6.

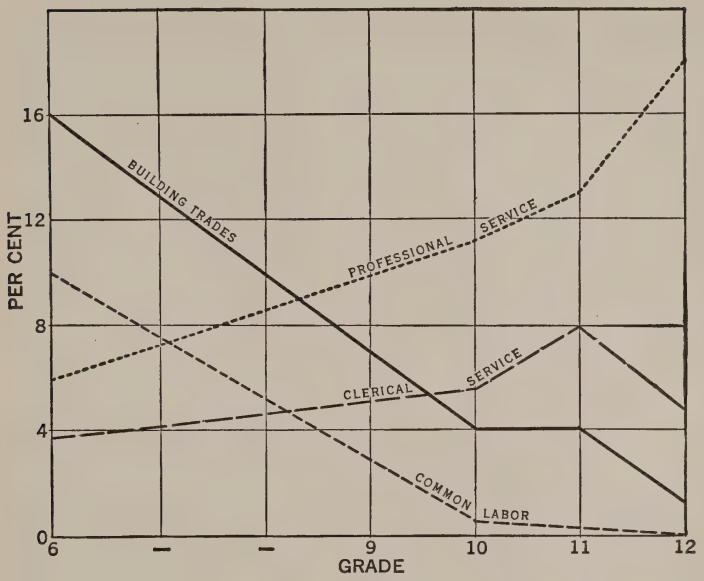

FIG. 82. PERCENTAGE OF CHILDREN IN GRADES VI, IX, X, XI, AND XII, WHOSE FATHERS ARE ENGAGED IN CERTAIN OCCUPATIONS (Counts.)

school than the children from the same occupational groups in the cities.[1] Differences in background, in social and vocational outlook, in appreciation of the value of high-school education, in interest and effort, and in capacity to do the type of work offered probably account for the differences in persistence in school of children from the various occupational groups.

4. *Other factors.* Van Denberg [2] concludes his investiga-

[1] See Uhl, *Principles of Secondary Education*, chap. 6; Gaiser, "Occupational Representation in High School," in *Journal of Educational Administration*, vol. 9, pp. 537–46.

[2] *Causes of the Elimination of Students in Public Secondary Schools of New York City*, p. 114.

tion of the elimination of almost a thousand high-school pupils in New York City nearly two decades ago as follows:

> Early elimination from high school is favored by a late entering age; by having younger brothers or sisters; by a childhood free from serious illness; by foreign-born parentage of Irish, Austro-Hungarian, Scotch, or Italian stock, by the choice of business as an occupation by boys or stenography by girls; by a disbelief in the value of a high-school course; by an uncertainty as to probable length of stay or a determination to leave early.
>
> On the other hand elimination does not seem to be greatly increased by eye strain or frequent headaches. There is no evidence that poverty causes early elimination.

But Holley,[1] studying high-school students in Illinois, found that the economic status of the family is an important factor in determining whether a child shall or shall not receive a high-school education.

Predicting the average scholarship of high-school students. The best single basis for predicting scholarship (i.e., school marks or other measures of scholastic attainments) in high school is the average mark received in the grades immediately preceding the high school. Next in order of predictive value are teacher's estimates (of industry, school attitude, intelligence, persistence, conscientiousness, etc.), intelligence and achievement tests, and chronological age. Let us examine the evidence upon which we have based these conclusions.

The writer investigated the value of several factors for predicting the scholastic success of pupils in the first year of the junior high school.[2] Two measures of success were used: (1) the average of each pupil's marks for both semesters in mathematics, history, geography, and English; and (2) a

[1] *Fifteenth Yearbook of the National Society for the Study of Education*, Part II.

[2] See *Journal of Educational Research*, vol. 12, pp. 359–69, for a brief account of the more important findings of that study.

composite comprising the average used in (1) and his scores on the Stanford achievement tests. The second criterion is the better one, and is used in making all comparisons. The conclusions from the correlation data of that study are as follows:

Sixth-grade marks correlate .70 with the composite scholarship criterion for 93 pupils who had been in junior high school for one year. Raw scores from group intelligence tests correlate from .33 to .66 with this criterion, averaging .57; group-test mental ages yield correlations ranging from .33 to .65, averaging .55; group I. Q.'s correlate from .50 to .74 with a mean of .67. Achievement tests correlate from .38 to .62 with this criterion of scholarship, the mean being .50.

Chronological age has a correlation of − .49 with scholastic success in first year of junior high school.

The multiple correlations between scholarship in first year of junior high school and the combination of sixth-grade marks and intelligence quotients from one group intelligence test range from .72 to .83, averaging .79; that is, using a group intelligence test with sixth-grade marks raises the correlation with junior-high-school scholarship an average of 9.5 points (from .696 to .791). One of the achievement tests adds about 6 points, the multiple correlations ranging from .72 to .79, and averaging .755.

Chronological age adds two thirds as much to the predictive value of sixth-grade marks as does a group intelligence test and, on the average, slightly more than does one of the five achievement tests used. The multiple correlation of sixth-grade marks and chronological age with the criterion is .76.

By adding a second group intelligence test or an achievement test such as the Holley Sentence Vocabulary Test to the combination of sixth-grade marks and a group intelligence test, we get a multiple correlation of .84 or .85 with first-year scholarship.

It is better to use sixth-grade marks and one group intelligence test, than to use two group intelligence tests. In the former case we get multiple correlations averaging .79; in the latter case, .76. Sixth-grade marks and chronological age, or one of the achievement tests, have as high predictive value as the intelligence quotients from two group intelligence tests. (See Table 43.)

TABLE 43. CORRELATIONS SHOWING THE VALUE OF CERTAIN FACTORS FOR PREDICTING SCHOLARSHIP IN FIRST YEAR OF JUNIOR SCHOOL

(Brooks)
N = 93

	MEASURE OF SCHOLARSHIP	
	Marks in Grade VII	Marks in Grade VII and Stanford Achievement Test Scores
School marks, Grade VI	.676	.696
School marks, Grades V and VI	.683	.636
Estimates of effort: 1st month in Grade VII	.541	.618
Chronological age		−.489
Thorndike-McCall Reading	.511	.617
Holley Sentence Vocabulary	.462	.579
Group Vocabulary Test (Binet List)	.400	.503
Kelly-Trabue Language Completion, Alpha	.296	.411
Woody-McCall Arithmetic	.342	.383
Stanford-Binet Test, M.A	.474	.588
I.Q		.725
Group Intelligence Tests:		
Dearborn C		
Raw Scores		.568
M.A	.476	.567
I.Q		.715
Dearborn D		
Raw Scores		.583
M.A	.474	.588
I.Q		.688
Haggerty Delta 2		
Raw Scores		.655
M.A	.450	.612
I.Q		.737
Illinois A		
Raw scores		.532
M.A	.412	.527
I.Q		.653
Miller A		
Raw Scores		.581
M.A	.501	.579
I.Q		.667
National A		
Raw Scores		.633
M.A	.496	.607
I.Q		.715
Otis-Self-Administering, A		
Raw scores		.644
M.A	.541	.645
I.Q		.694
Pintner, Non-Language		
Raw scores		.330
M.A	.304	.331
I.Q		.496
Terman, A		
Raw scores		.616
M.A	.401	.517
I.Q		.687
Mean for Group Intelligence Tests		
Raw Scores		.572
M.A		.553
I.Q		.672

We may also ascertain the predictive value of these various factors by dividing the pupils into three sections on each one, then dividing them into three sections according to seventh-grade scholarship, and finally comparing each of the former with the latter to see which basis of sectioning really does give groups which are the most homogeneous in achievement. Here again sixth-grade marks form as accurate a basis of sectioning as the Stanford-Binet or Terman

TABLE 44. PER CENT OF AGREEMENT OF SECTIONING BY TESTS AND SCHOOL MARKS WITH SECTIONING BY CRITERION OF SCHOLARSHIP IN FIRST YEAR OF JUNIOR HIGH SCHOOL: THREE-FOLD GROUPING

(Brooks)
N = 93

BASIS OF SECTIONING	PER CENT CORRECTLY SECTIONED	PER CENT DISPLACED ONE SECTION	PER CENT DISPLACED TWO SECTIONS
Chance	33.3	44.4	22.2
Miller (I.Q.)	54.8	40.9	4.3
Otis (I.Q.)	61.3	35.7	3.0
Illinois (I.Q.)	45.2	47.3	7.5
Terman (I.Q.)	63.4	32.3	4.3
Haggerty (I.Q.)	57.0	38.7	4.3
National (I.Q.)	59.1	36.6	4.3
Dearborn C (I.Q.)	54.8	43.0	2.2
Dearborn D (I.Q.)	52.7	40.8	6.5
Pintner	49.5	39.7	10.8
Mean, Group Intelligence Tests	55.3	39.4	5.2
Thorndike-McCall Reading	50.5	40.9	8.6
Woody-McCall Arithmetic	52.7	34.4	12.9
Holley Vocabulary	45.2	43.0	11.8
Kelly-Trabue Language Completion	39.8	45.1	15.1
Group Vocabulary (Binet List)	47.3	40.9	11.8
Mean, Achievement Tests	47.1	40.9	12.0
Stanford-Binet (I.Q.)	64.5	30.1	5.4
Chronological Age	51.6	40.9	7.5
Sixth-Grade Marks	63.4	34.4	2.2
Combination of Sixth-Grade Marks and Haggerty (I.Q.)	73.1	25.8	1.1

group intelligence tests, and a better basis than the other group tests; but a combination of sixth-grade marks and I.Q.'s from a group intelligence test, like Haggerty Delta 2, gives very much better results than any one factor alone. (See Table 44.)

A composite of sixth-grade marks (or fifth- and sixth-grade marks) and ratings on a good group intelligence test give better prediction of average marks in the first year of high school than do any other two factors upon which reliable data have been reported. Once a pupil is in high school, his average marks for one year are good evidence of the kind of work he will do the following year. Investigation has shown correlations of .64, .69, and .75 between the average marks of pupils in the academic course in grades nine and ten, ten and eleven, and eleven and twelve, re-

TABLE 45. CORRELATIONS SHOWING THE VALUE OF SCHOOL MARKS AND CHRONOLOGICAL AGE FOR PREDICTING SCHOOL MARKS IN GRADES NINE TO TWELVE OF A GIRL'S HIGH SCHOOL

(Unpublished data from Brooks and Silbert)

	HIGH-SCHOOL COURSE	
	Academic (N=186)	Commercial (N=81)
Simple correlations between		
C.A. and average marks in Grade IX...	−.21	−.23
C.A. and average marks in Grade X...	−.29	−.29
C.A. and average marks in Grade XI..	−.33	−.20
C.A. and average marks in Grade XII..	−.31	−.20
Average marks in Grades IX and X....	.64	.55
Average marks in Grades IX and XI...	.64	.55
Average marks in Grades IX and XII..	.50	.45
Average marks in Grades X and XI....	.69	.76
Average marks in Grades X and XII...	.59	.65
Average marks in Grades XI and XII..	.75	.70
Multiple correlations between		
Average marks in Grade XI and in Grades IX and X.....	.74	.78
Average marks in Grade XII and in Grades X and XI.....	.76	.72

spectively. (See Table 45.) In the commercial course the corresponding correlations were .55, .76, and .70, respectively.[1]

These results not isolated or unusual. An extensive survey of the literature on the subject corroborates our findings. Probably the earliest comparison of elementary- and secondary-school marks was made by Miles [2] who found that the average of all school marks in the elementary grades correlated .71 with the average high-school marks of pupils who had been in high school from two to four years. Kelley [3] compared (1) elementary school marks, (2) teachers' estimates of intelligence, conscientiousness, etc., and (3) the scores on certain specially devised tests in English, history, and mathematics with the average marks in first-year high school. His results (Table 46) also show elementary-school marks having the best predictive value for high-school marks. Teachers' estimates rank second; the tests in English, history, and mathematics rank third. The best composite gave correlations ranging from .76 to .89.

In 1923, Jordan [4] reviewed the typical studies on the relationship between group intelligence tests and high-school marks. We give his summary in Table 47. The average of the fifty correlations is .43. Jordan's own results [5] on sixty-seven first-year high-school pupils show correlations averaging .47.

[1] In another investigation by the author the average marks of 45 freshmen correlated .81 with their average marks the following year; the correlations between sophomore and junior marks were .74 and .85 for two successive classes numbering 36 and 44 pupils, respectively. The corresponding correlations between combined intelligence ratings on two group tests and average school marks were .61, .47, and .34, respectively.

[2] *Comparison of Elementary and High School Grades*, 1911.

[3] *Educational Guidance.*

[4] "The Validation of Intelligence Tests"; in *Journal of Educational Psychology*, vol. 14, pp. 414–28.

[5] "Correlations of Four Intelligence Tests with Grades"; in *Journal of Educational Psychology*, vol. 13, pp. 419–29.

TABLE 46. CORRELATIONS BETWEEN AVERAGE MARK IN FIRST-YEAR HIGH SCHOOL AND VARIOUS FACTORS

(Kelley)
N = 59

Average mark in Grade VII	.72
Average mark in Grade VI	.73
Average mark in Grade V	.53
Average mark in Grade IV	.62
Composite of elementary-school marks	.79
Teachers' estimates of intellectual ability	.72
Teachers' estimates of conscientiousness	.62
Teachers' estimates of emotional interest in school work	.58
Teachers' estimates of oral expression	.63
Composite of teachers' estimates	.76
Composite of English, history, and mathematics tests	.51
Composite of all data	.89
Age	−.31

TABLE 47. THE CORRELATION OF HIGH-SCHOOL MARKS AND GROUP INTELLIGENCE TEST RESULTS

(Collected by Jordan)

TESTS	COEFFICIENTS		
	Number	Range	Average
Army Alpha	26	.19 to .51	.38
Miller	1		.56
Otis	14	.31 to .82	.47
Terman	9	.30 to .67	.47

Other investigations[1] show correlations closely enough similar to the ones we have presented to indicate that they are typical of the relationship existing between group intelligence tests and high-school marks.

Chronological age almost uniformly correlates negatively

[1] See, for example, at the end of this chapter the references to Book, Proctor, Rector, and Unzicker.

with high-school marks, the coefficients averaging around $-.30$ to $-.35$.

Ross [1] has shown that the simple average of elementary-school marks (Grades II to VIII) correlates .60 with marks in ninth grade. He found a group intelligence test correlating .37 with ninth-grade marks in another school. According to his results, the following factors were of most significance in predicting first-year high-school marks: English marks in Grades IV to VI, arithmetic marks in Grades VII and VIII, effort in Grades VII and VIII, age at the end of Grade VIII, and days present in Grades IV to VI. By combining these factors by the multiple-ratio correlation technique to secure the best composite of elementary-school record, he obtained coefficients of .68, .67, .56, and .65 with marks of first-year high-school students during four successive years, and a coefficient of .69 in another school. Here again elementary-school marks were superior to intelligence tests in forecasting high-school scholarship.

We have made an extensive canvass of the investigations reported on this topic and find that Fretwell's [2] correlations of .56 between a composite of eleven psychological tests and average marks in Grade VII, and of .49 between average of all marks in Grades I–VI and marks in Grade VII, are not supported by the results of other studies.

By combining two or three factors, such as elementary-school marks (especially from Grades V and VI), intelligence-test scores, teachers' estimates (of effort, attitude, etc.), and chronological age, one may obtain multiple correlations of .80 or .85 with marks in first year of junior high school. If more factors are used, it may be possible to push the correlation up to .90, but highly reliable measures are needed to secure such coefficients.

[1] *Relation between Grade School Record and High-School Achievement.*

[2] *A Study in Educational Prognosis.*

Predicting scholarship in various high-school subjects. The author has sought to determine the value of various factors for predicting scholarship in the junior-high-school subjects. For the sake of brevity these results are combined into Table 48, which is used in discussing the prognosis of scholarship in the various subjects.[1]

English. From available data (see Tables 48 and 49) we conclude that a pupil's elementary-school record is probably the best means of predicting his English marks during the first year in high school, and that teachers' estimates of intelligence and a group intelligence test (or Allen's Latin

TABLE 48. CORRELATIONS FOR PREDICTING SCHOLARSHIP IN CERTAIN JUNIOR-HIGH-SCHOOL SUBJECTS

(Brooks)

	Chron. Age	Av. Marks in Grade				Trs.* Est. Intell.	M.A.* Ill.	M.A.* Nat'l.	Read.*	Arith.*
		V	VI	VII*	VIII					
Grade VII, N = 287										
1. English	−.43	.49	.63			.59	.40	.42	.35	.28
2. Mathematics	−.36	.34	.45			.57	.43	.39	.27	.49
3. Geography	−.38	.41	.55			.65	.34	.36	.29	.28
4. History	−.35	.41	.52			.69	.38	.42	.29	.31
Av. mark	−.43	.47	.61			.72	.44	.44	.34	.38
Grade VIII, N = 93 (Academic Course)										
1. English	−.45	.48	.62	.71		.38	.39	.47	.30	.32
2. Mathematics	−.39	.43	.48	.76		.42	.43	.41	.17	.29
3. Geography	−.33	.43	.44	.63		.39	.25	.28	.18	.21
4. History	−.55	.47	.60	.82		.53	.39	.41	.31	.20
5. Latin	−.35	.55	.51	.67		.29	.25	.29	.20	.16
6. Genl. Science	−.39	.45	.57	.73		.46	.32	.30	.03	.20
Av. mark	−.45	.57	.64	.88		.53	.41	.42	.24	.31
Grade IX, N = 73 (Academic Course)										
1. English	−.30	.34	.54	.69	.79	.36	.23	.28	.18	.04
2. Mathematics	−.24	.28	.25	.45	.61	.23	.42	.30	.04	.30
3. Latin	−.21	.29	.36	.50	.71	.24	.22	.25	.21	.14
4. French	−.40	.38	.48	.67	.73	.30	.26	.33	.18	.17
5. Civics	−.14	.19	.15	.43	.50	.28	.22	.24	.21	.20
Av. mark	−.24	.35	.42	.64	.78	.33	.32	.32	.18	.20

* These tests and estimates were given at the very beginning of Grade VII. Thorndike-McCall Reading and Woody-McCall Arithmetic tests were used. Average mark in Grades VII, VIII, and IX is the average of each pupil's marks in the subjects listed for each grade in column 1 of this table.

[1] Tables of correlations for pupils in the technical and commercial courses are not given here.

TABLE 49. CORRELATIONS BETWEEN MARKS IN HIGH-SCHOOL ENGLISH AND VARIOUS FACTORS

SUBJECT	PREDICTIVE FACTOR	NUMBER OF		COEFFICIENTS OF CORRELATION	
		Pupils	Coefficients	Range	Mean
English I or Grade VII English	Intelligence Test	1138	9	.35 to .72	.50
English I (1st Semester)	Allen Prognosis Combined	364	1		.55
Av. H.S. English	Intelligence	124	1		.44
English I	Ross Grade School Composite	632	5	.60 to .67	.63
English I	Thorndike-McCall Reading	79	1		.46
English II	English I		10	.50 to .67	.59
English III	English I		9	.38 to .59	.51
English III	English II		10	.52 to .68	.60
English IV	English I		11	.02 to .52	.38
English IV	English II		9	.23 to .64	.49
English IV	English III		12	.28 to .68	.56
Average H.S. English	Algebra I		12	.19 to .64	.45
Average H.S. English	English I		12	.35 to .67	.56
Average H.S. English	History I		9	.39 to .76	.59
Average H.S. English	Latin I		9	.25 to .62	.51

Note. Tables 49–53 include data from the author and from many other sources.

prognosis battery [1]) are next in value. The English marks of each succeeding year seem to be forecast best by the average marks in the academic subjects studied the previous year, and by the English marks of the year preceding, the author obtaining correlations averaging from .70 to .77 in the three courses of the junior high school. History I, however, seems to predict average English marks for the whole high-school course nearly as well as any other factor, the correlations averaging .59.

Mathematics. The wide ranges of correlations between high-school marks in mathematics and the various predictive factors listed in Tables 48 and 50 are typical. In the case of Algebra I or Junior-High-School Mathematics I, the coefficients average less than .50; [2] but mathematics in the

[1] *A Study in Latin Prognosis.*

[2] The authors of the Orleans Algebra Prognosis Test report that it correlates around .80 with achievement in first half-year of Algebra I.

second and third years of junior high school correlated, according to the author's data, from .55 to .75 with mathematics or the academic average of the preceding year. Geometry I has an average correlation of .54 with Algebra I. More significant is the closer relationship between Algebra I and II, although a year intervenes between them. Of course, Algebra I and II have greater community of function than Geometry and either Algebra I or Algebra II. The

TABLE 50. CORRELATIONS BETWEEN HIGH-SCHOOL MATHEMATICS AND VARIOUS FACTORS

SUBJECT	PREDICTIVE FACTOR	NUMBER OF		COEFFICIENTS OF CORRELATION	
		Pupils	Coefficients	Range	Mean
Algebra I or Junior H. S. Math. I	Intelligence Test	911	8	.34 to .54	.44
Algebra I	Thorndike-McCall Reading	79	1		.31
	Woody-McCall Arith.	79	1		.46
H.S. Math. Average	Intelligence Test	315	2	.37 to .49	.43
Math. Gr. IX	Allen Prognosis Test Combined	364	1		.53
Math. Gr. IX	Ross Grade School Composite	632	5	.42 to .51	.48
Geometry	Intelligence Test	108	1		.51
Geometry	Algebra I	2143	17	.38 to .70	.54
Geometry	English I	1773	15	.25 to .67	.43
Geometry	History I	33	1		.64
Geometry	French I	33	1		.61
Geometry	General Science	128	3	.40 to .53	.48
Algebra II	Intelligence Test	108	1		.49
Algebra II	Algebra I	473	5	.61 to .74	.67
Algebra II	English I	82	3	.25 to .44	.35
Algebra II	General Science	49	2	.25 to .55	.40
Algebra II	French I	33	1		.53
Algebra II	First Year Av.	33	1		.64
Algebra II	English II	33	1		.39
Algebra II	Geometry	313	4	.47 to .73	.61
Algebra II	Second Year Av.	33	1		.57
Algebra II	Chronological Age	108	1		−.24
Trigonometry	Algebra I	41	1		.69
Trigonometry	Algebra II	41	1		.70
Trigonometry	Geometry	40	1		.66
Trigonometry	Chronological Age	41	1		−.09
Multiple Correlations					
Algebra II	Algebra I and Geometry	108	1		.75
Algebra II	Algebra I and Intelligence	108	1		.68
Algebra II	Geometry and Intelligence	108	1		.66
Algebra II	Algebra I, Geometry, and Intelligence	108	1		.75

few data on trigonometry indicate that algebra in the freshman or junior year gives a slightly better prognosis than geometry.

Science. We have at hand few data on predicting marks in high-school science; consequently, our conclusions must be regarded as tentative. According to one study, General Science correlated .50 with ratings on a group intelligence test. Our own data indicate that the average marks in the academic subjects of the preceding term or year give the best prognosis. We found correlations averaging .62, .67, and .73, respectively, in the case of pupils taking the commercial, technical, and academic courses. The data of Table 51 show a close relationship between Physics and Chemistry. Whichever comes first in the high-school course yields the best prognosis of the other. In one school Chemistry preceded Physics and correlated

TABLE 51. CORRELATIONS BETWEEN HIGH-SCHOOL MARKS IN SCIENCE AND VARIOUS FACTORS

SUBJECT	PREDICTIVE FACTOR	NUMBER OF		COEFFICIENTS OF CORRELATION	
		Pupils	Coefficients	Range	Mean
General Science	Intelligence	75	1		.50
H.S. Science Average	Intelligence	372	2	.44 to .46	.45
Physics	Algebra I	164	3	.36 to .84	.65
Physics	Algebra II	79	2	.53 to .56	.55
Physics	Geometry	219	4	.57 to .74	.64
Physics	Chemistry	88	2	.63 to .78	.71
Physics	First Year Average	52	1		.70
Physics	Second Year Average	52	1		.62
Physics	General Science	38	1		.47
Physics	History I and II	74	1		.62
Physics	English I (or I and II)	168	3	.39 to .61	.47
Physics	French I	130	2	.49 to .58	.54
Physics	Chronological Age	90	2	−.04 to −.37	−.21
Chemistry	Algebra I	130	2	.63 to .71	.67
Chemistry	Algebra II	45	1		.64
Chemistry	Geometry	130	2	.36 to .67	.52
Chemistry	Biology	53	1		.27
Chemistry	First Year Average	58	1		.62
Chemistry	Second Year Average	58	1		.54
Chemistry	Physics	130	2	.60 to .83	.72
Chemistry	Chronological Age	58	1		.15
Electricity	Physics	130	2	.37 to .69	.53
Mechanics	Physics	130	2	.32 to .68	.50

with it .71; in another school Physics came before Chemistry and correlated .72 with it. Other factors correlating more than .60 with marks in Physics are Algebra I, Geometry I, first-year average, second-year average, and History I and II; for Chemistry they are Algebra I and II and first-year average.

Social studies. The data of Table 48 indicate that teachers' estimates of intelligence and the average of fifth- and sixth-grade marks give the best prognosis of scholarship in history and geography in the first year of junior high school. In the second year the average first-year marks in the academic subjects and the first-year marks in the social studies give the best prediction in the academic, technical, and commercial courses, the correlations averaging slightly more than .70 for history and slightly less than .60 for geography. Junior-high-school marks in civics cannot be prophesied very accurately, according to our data; but even less accurately, according to Table 52.

Table 52. Correlations Between High-School Marks in the Social Studies and Various Factors

Subject	Predictive Factor	Number of		Coefficients of Correlation	
		Pupils	Coefficients	Range	Mean
Ancient History	Intelligence Test	121	1		.41
Jr. H.S. History I	Intelligence Test	425	1		.47
History Average	Intelligence Test	124	1		.25
History Average	Algebra I	1709	11	.25 to .61	.47
History Average	English I	1519	11	.34 to .66	.49
Civics	Algebra I	1177	9	.28 to .59	.39
Civics	English I	964	9	.00 to .54	.36
Social Science Average	Intelligence Test	257	1		.42

Foreign languages: French, German, and Latin. Available data on the prognosis of success in French and German should be supplemented by further research. According to Table 48, the average of second-year academic marks correlates .73 with French I in the third year of junior

high school. The Wilkins Prognosis Test correlated .55 with French I in the case of a small group of boys in a technical high school. Orleans and Solomon announce that their Latin Prognosis Test correlated .80 with the first semester's achievement in Latin of one group of pupils. The next best prediction is from Clem's [1] 6-factor prognosis battery which gives an average correlation of .77 with achievement in first semester of Latin I. Intelligence test ratings correlate around .40; grade school composite .65. Our own data (Table 48) show that the average marks in the academic subjects for the preceding year give the best prognosis of Latin in the junior high school. After pupils have studied Latin one year the best basis of forecasting success in any year is the Latin mark of the year immediately preceding, according to Table 53 the correlations of Latin

TABLE 53. THE RELATIONSHIP BETWEEN HIGH-SCHOOL MARKS IN FOREIGN LANGUAGES AND CERTAIN OTHER FACTORS

SUBJECT	PREDICTIVE FACTOR	NUMBER OF		COEFFICIENTS OF CORRELATION	
		Pupils	Coefficients	Range	Mean
French I	Intelligence Test	116	1		.43
French I (1st. Sem.)	Wilkins Prognosis Test	36	1		.55
German	Algebra I	1796	12	.42 to .63	.50
	English I	1151	12	.35 to .63	.46
Latin I	Intelligence Test	399	3	.18 to .65	.40
Latin I (1st. Sem.)	Allen Prognosis Combined	364	1		.59
Latin I (1st. Sem.)	Clem Prognosis 6-factor	398	3	.66 to .84	.77
Latin I	Ross Grade School Composite	632	5	.57 to .73	.65
Latin II	Latin I	810	11	.53 to .79	.68
Latin III	Latin I	398	7	.46 to .70	.58
Latin III	Latin II	292	6	.70 to .80	.75
Latin IV	Latin I	212	6	.22 to .69	.48
Latin IV	Latin II	143	4	.57 to .74	.64
Latin IV	Latin III	142	4	.57 to .75	.68
Latin Average	Intelligence Test	124	1		.26
Latin Average	Algebra I	1178	12	.15 to .70	.50
Latin Average	English I	1213	12	.29 to .64	.48
Foreign Language Average	Intelligence Test	204	1		.63

[1] *Detailed Factors in Latin Prognosis.*

I and II, II and III, and III and IV averaging .68, .75, and .68, respectively.

Commercial subjects. Reported correlations between intelligence and bookkeeping and stenography are not high (.35 to .45). An unpublished study by one of the author's students (see Tables 54 and 55) indicates that high-school marks received before a pupil begins stenography give as good prediction as intelligence test results. A composite of two factors, such as intelligence and mathematics (or science, or foreign language), mathematics and science, or mathematics and foreign language (or English), gives the best prediction, which, however, is only 17 per cent more accurate than guessing. Another similar study shows a correlation of .52 between shorthand marks and Hoke prognosis

TABLE 54. VALUE OF CERTAIN FACTORS FOR PREDICTING STENOGRAPHY

(Unpublished data from Dawson)

N = 53

SUBJECT	INTELLIGENCE	CHRON. AGE	HIGH-SCHOOL MARKS IN			
			Foreign Language	English	Mathematics	Science
Stenography.....	.44	.10	.43	.34	.49	.45

TABLE 55. MULTIPLE CORRELATIONS BETWEEN STENOGRAPHY AND VARIOUS TWO-FACTOR COMBINATIONS

(Dawson)

N = 53

	CHRON. AGE	FOREIGN LANGUAGE	ENGLISH	MATHEMATICS	SCIENCE
Intelligence.....	.47	.52	.47	.56	.55
Chron. Age.....		.45	.36	.49	.46
Foreign Language...			.45	.53	.49
English.....				.51	.42
Mathematics.....					.56

Note. Table 55 is to be read as follows: Intelligence and Chronological age have a multiple correlation of .47 with stenography, etc.

scores of 89 pupils in Grade X. The factors we have studied seem to have little value for predicting success in bookkeeping or typewriting, although they are of considerable value in forecasting success in other subjects of the junior high school.

Other subjects. Some work has been done on the prognosis of achievement in domestic science, manual training, mechanical drawing, and other allied subjects. Intelligence usually has correlated from .25 to .55 with marks, averaging around .40.

High-school marks predicted best by a composite of two or more factors. At the present time, high-school scholarship is predicted more accurately by a composite of two or more factors than by any one factor, and probably just because several factors really do condition it. Previous school marks are usually one important element in a good composite. This is not at all surprising. We would expect past and present performance to be a fairly safe guide to future performance. Do we mean by this that school marks are highly accurate and reliable? Not necessarily; but the evidence clearly indicates that they are one of the most valuable means of prediction upon which reliable repeated investigations have been made.

Several well-known studies of the marks which different teachers assign a set of papers have shown a high degree of disagreement and inconsistency, almost suggesting, in the case of a geometry paper graded by 116 high-school mathematics teachers, that the mark assigned was more a function of who graded the paper than of what the pupil had written on it. The writer is inclined to believe that the accuracy of *term marks* should not be confused with that of the marks *assigned to a set of papers* in English, mathematics, or history. Term marks are based upon daily recitations, informal quizzes, special assignments, examinations, effort,

and attitude, and really are a composite. They should be and undoubtedly are more accurate and reliable than marks assigned a set of papers. In our own investigation (see pages 558–62) the junior-high-school marks were assigned by three to eight teachers; the pupils came from five elementary schools; and a dozen or more teachers gave the sixth-grade marks. The probability is that under good conditions in Grades IV to VI the teachers include in term marks on a five-fold rating scheme some estimates of other qualities, traits, or abilities which are symptomatic of success in the succeeding grades.

A combination of past and present achievement, of attitude and effort, and of mental or special ability gives the best prediction of high-school scholarship at the present time. With further research highly valuable batteries of prognosis tests may become available for educational and vocational guidance.

6. *Predicting success in college*

Problems of college entrance. During the later teens prediction of academic success in the early years of college is an important problem. Many American institutions are overcrowded and enroll many persons who cannot or do not use profitably the educational facilities provided. Restricting registration is a complex matter; it is now being regarded largely as one of selecting for admission those students who give promise of profiting most by the training which the college offers. Various bases of admission are being used and proposed. A full discussion of the bases used would carry us too far afield, so we must limit ourselves to a brief consideration of the three following methods which, singly or in combination, have wide use: (1) certificate of graduation from high school, with fifteen acceptable units (or in some cases twelve senior-high-school units), with or

without the recommendation of the high-school principal; (2) passing marks on entrance examinations, such as those given by the College Entrance Board; and (3) satisfactory scores on psychological examinations, especially on intelligence tests.

High-school marks and college success. The number of units offered for entrance does not seem to have much value for forecasting academic success in college. A minimum of fifteen units usually is required for admission anyway, and the few excess credits offered are not at all symptomatic of honor points in college, the correlation being but .22, according to one investigation.[1] High-school marks have much more value. While their predictive value varies greatly from one college to another (the correlations ranging from .26 to .77), and from one year to another in the same institution, yet they are at present the best single basis of admission to colleges of arts and sciences which has thus far been extensively investigated. The average correlation of Table 56 is .53. It is not surprising that high-school scholarship is symptomatic of scholarship in college. Indeed one would expect the two to bear a reasonably close relation. The predictive value of high-school marks can be increased considerably, as we see presently.

Predicting college success from entrance examinations. The value of entrance examinations as evidence of success in college is second only to that of high-school marks, the correlations (see Table 56) averaging .47 (range .22 to .64) in colleges of arts and sciences. In specialized schools, such as those of engineering, special examinations given at entrance seem to be a better basis of admission than high-school marks. In one case[2] the correlation between the high-

[1] May, "Predicting Academic Success"; in *Journal of Educational Psychology*, vol. 14, pp. 429–40.

[2] See *Report on the Use of Intelligence Examinations in Columbia College.*

TABLE 56. CORRELATIONS BETWEEN SUCCESS IN COLLEGE AND (1) HIGH-SCHOOL MARKS, (2) ENTRANCE EXAMINATIONS, AND (3) INTELLIGENCE RATINGS

REPORTED BY	INSTITUTION	CORRELATION BETWEEN COLLEGE MARKS AND		
		High-School Marks	Entrance Examination	Intelligence
Anderson and Spencer	Yale		.44, .44, .25, .34, .22, .45	.38, .37, .38
Arlitt and Hall	Bryn Mawr		.54, .55, .54, .52, .49, .64	.30, .10, .10, .20, .17, .27, .29, .35
Beatley	Harvard	.56, .56, .69, .58	.50, .46, .47, .41	
Bolenbaugh and Proctor	Stanford	.28, .49		.45, .37
Cocking	Iowa	.55		.44
Columbia College Report	Columbia	.45	.43, .57	
	Cornell	.47		
	Ohio State	.38	.55	
	Smith		.46, .40	
Dempster	Johns Hopkins	.53		.47
Ernest	Pittsburg			.41
Grauer and Root	Pittsburg			.39
Hawks	Gettysburg	.64		
	Johns Hopkins	.66, .77, .72		
	Vanderbilt	.69		
Johnston	Minnesota	.63		.50
Kornhauser	Chicago	.46, .51, .47, .47	Read. Test .55, .32, .56, .54	.51, .42, .49, .51, .55
Lincoln	Harvard	.69	.47	
MacPhail	Brown	.29		.47
May	Syracuse	.41		.60
Murray	Sweet Briar			.42, .44
Nelson and Denny	Iowa St. Trs. College			.45, .49

TABLE 56 (*continued*)

REPORTED BY	INSTITUTION	CORRELATION BETWEEN COLLEGE MARKS AND		
		High-School Marks	Entrance Examination	Intelligence
Odell	Illinois	.55		.38
Proctor	Stanford	.45		.41
Quiler	Ohio State			.47, .52, .49
Rosenow	Kansas			.44
Scates	Chicago	.61	.46	
Seashore	Columbia	.35	.45, .53	
Smith	Iowa	.53		
Spencer	Johns Hopkins			.58, .51, .60, .41
Stone	Dartmouth			.44, .33, .50
Symonds	Hawaii	.52		.41
Terman	Arkansas	.54		.42, to .65
	Columbia	.63	.62, .50, .47, .25	.60
	Iowa	.53		
	Stanford	.54, .42		
	Texas	.69, .74, .65, .38		
Thurstone	26 Colleges			.24 to .56 Av. .45
Whitman	Minnesota	.40		Av. .29
Wood	Columbia	.26	.64	.49, .60, .67, .50, .59
Average		.53	.47	.44
Bott	Toronto (Medicine)		.27, .40	
Cleeton	Carnegie Inst. Tech.		Ia. Content, .49, .50	.44, .42
Thurstone	43 Engineering Schs.	.29		

school marks and marks in the college of engineering was .29; between the latter and special entrance examination, .55. At Carnegie Institute of Technology the Iowa Content Examination correlated around .50 with first-year college marks, whereas high-school marks usually have given correlations around .30.[1] New-type examinations have slightly greater value than the old-type entrance examinations,[2] as we would expect on account of their greater objectivity and reliability, and probably greater comprehensiveness.

Intelligence test results and college success. Intelligence tests have been given to the entering students in a great many colleges, and the results have been compared with students' academic records. On the whole, they rank third among the three bases of admission, the average correlation (Table 56) being .44 (range .10 to .67). However, all tests are not of equal value. Some of them, like the Thorndike Test for High-School Graduates, have greater predictive value than others, such as Army Alpha. This is to be expected. Other things equal, a three-hour test is more reliable than a twenty- or thirty-minute one, and, in addition to statistical considerations of reliability, there is reason to believe that a two- or three-hour test is better for college students than a half-hour test. The ability to work intensively for three hours should be more symptomatic of college success than the ability to work at high pressure for thirty minutes. Accordingly, the former should be a more valid test of the abilities that make for academic success in college.

The Stanford-Binet did not show much value for predic-

[1] See Cleeton, "The Predictive Value of Certain Measures of Ability in College Freshmen"; in *Journal of Educational Research*, vol. 15, pp. 357–70.

[2] See for example, Beatley, "The Relative Standing of Students in Secondary Schools, on Comprehensive Entrance Examinations, and in College"; in *School Review*, vol. 30, pp. 141–47.

tion at Bryn Mawr;[1] the correlations between I.Q'.s[2] and freshman and sophomore marks ranged from .10 to .30 for two different classes. The Stanford-Binet tests were not, of course, designed to appraise the mentality of normal and superior adults. Their value with elementary-school pupils and younger high-school students is too well known to require discussion here.

College success of night-high-school graduates. There are several hundred evening high schools in the United States, enrolling approximately a half-million students. A wide variety of courses is offered. Graduates have found difficulty in securing admission to higher institutions of learning. The colleges and universities have refused them admission on the grounds that three 45-minute recitation periods per week for a term of 24 to 32 weeks are not equivalent to a year's work in a standard high school; the amount of time is approximately a half or two thirds. The number of recitation hours, however, is of less significance than the mental ability and achievement of these students in high school and college.

Fortunately we have some information from a study[3] of Baltimore Evening-High-School students. It indicates

[1] See Arlitt and Hall, "Intelligence Tests vs. Examinations as a Means of Predicting Success in College"; in *Journal of Applied Psychology,* vol. 7, pp. 330–38.

[2] It might be objected that the I.Q. is not the appropriate measure to use, since it represents degree of brightness rather than amount of mental ability at a particular time. In general this is true, expecially in the elementary and junior high school; but nearly all college freshmen are sixteen years of age or over, so that practically all Binet mental ages would be divided by sixteen. Accordingly, the I.Q. would give the same correlations as would the mental ages, because the size of the coefficient of correlation is not altered by multiplying or dividing all of one set of scores by the same number.

[3] J. Carey Taylor, *A Comparison of the Baltimore Evening High School Students with Those of the Day High Schools, to Determine the Former's Probability of Success in College.* Master's Essay, Johns Hopkins University, 1927.

that those who graduate do as good work as the day-high-school students and have as much mental ability, and that those who go to college do succeed. Taylor's data show that evening-high-school seniors did, on the average, very nearly as well as the day students on certain standard tests in English, physics, American history, Latin, French, algebra, and geometry. Teachers who taught the *same courses* to both evening and day students rated the evening pupils above day pupils in both ability and achievement.

On the Terman group intelligence test the one hundred evening-high-school seniors' scores were slightly more variable than the Terman norms (see Table 57), but the three quartiles were the same. A better comparison is made by using the scores of the thirty-seven academic seniors, for it is in this group that prospective college students will be found. This group is distinctly above the norms for high-school seniors, their median score being the same as that of the seventy-five percentile senior on Terman's norms.

TABLE 57. SCORES OF BALTIMORE EVENING-HIGH-SCHOOL SENIORS ON THE TERMAN GROUP TEST OF MENTAL ABILITY
(Taylor)

PERCENTILE	NORM	BALTIMORE EVENING-HIGH-SCHOOL SENIORS	
		All N = 100	In Academic Course N = 37
10	100	93	118
25	122	123	150
50	147	147	170
75	169	170	182
90	185	189	203

The records of 29 graduates who entered college (usually as special students) show they had taken 129 courses with the following results:

College Mark	Per cent Receiving
90–100	37.4
80–89	41.0
70–79	20.9
Below 70*	.7

* Below 70 = condition.

Taylor's results are not surprising. The evening-high-school senior class averages one, two, or more years older than in the day high schools. Many students had previously quit school to earn part or all of their living; others were not interested or saw no value in a high-school education. Many had entered night high school because they saw the need of it to accomplish some purpose they had in mind. The senior group included many students who were very eager and anxious to succeed, and were willing to work hard to attain success. We do not mean to say that all night-high-school students are suitable candidates for admission to college, but, if further investigation corroborates Taylor's results, we would conclude that the academic course in the evening high school is such a selective factor that those who complete it are essentially similar to day-high-school seniors.

A composite basis of admission desirable. A combination of two or more bases of admission is likely to be better than any one basis alone. All the evidence indicates that high-school marks and intelligence examinations together give better prediction than either one by itself. This is what we found in predicting high-school success. The more comprehensive the basis, the better it is. (See Table 58.)

Proctor has suggested a threefold basis of admission to college consisting of: (1) a scholarship-rating based on all high-school marks; (2) the intelligence-test score on the Thorndike test; and (3) character ratings by high-school teachers. Such a comprehensive basis would be expected

TABLE 58. SIMPLE AND MULTIPLE CORRELATIONS SHOWING THE RELATIVE VALUES OF A COMPOSITE *versus* A SINGLE BASIS OF ADMISSION TO COLLEGE

REPORTED BY	CORRELATION OF COLLEGE MARKS WITH	MULTIPLE CORRELATION OF COLLEGE MARKS WITH
Dempster at Johns Hopkins University	H.S. average..... .53 Intelligence..... .47	H.S. average and Intelligence..... .61
Johnston at University of Minnesota	H.S. ranks..... .50 Intelligence..... .60	H.S. ranks and Intelligence..... .67
May at Syracuse University	Intelligence..... .60 H.S. average.... .40 Units of entrance .22	Intelligence, H.S. average and units of entrance..... .64
McCrory at St. Cloud, Minn., Teachers College	H.S. average.... .66 Intelligence..... .46	H.S. average and Intelligence..... .68
Symonds at University of Hawaii	H.S. average..... .52 Intelligence..... .41	H.S. average and Intelligence..... .59

to yield better results; but improved techniques in the character ratings are needed before they will contribute much to the other two, because MacPhail [1] has shown that the character rating given by high-school *principals* correlated but .17 with freshman-year marks. Even more striking is the correlation of .14 between these ratings and high-school marks, amply justifying MacPhail's comment "either that the estimates are extremely inaccurate measures of the qualities which it is desired to measure or that these qualities have very little to do with success in high-school classes." Probably both factors were at work lowering the correlations. Certainly some of the traits, such as popularity, cheerfulness, and features of leadership, would not be expected to have great significance in predicting scholastic attainments in either high school or college.

[1] *Intelligence of College Students*, p. 122.

Other means may be employed to improve the prediction of college success besides combining two or more bases of admission. Let us note very briefly a few of them.

How prediction of college success can be improved. Certain possible ways of improving the prediction of academic success in college give promise of yielding valuable returns; they also are applicable to forecasting high-school scholarship. Workers in educational measurements know that one very promising way of increasing the accuracy of prediction is to use measures having greater reliability. Both high-school and college marks can be improved in this respect [1] through greater objectivity and comprehensiveness of the data upon which they are based. They will then have more significance. Entrance examinations and intelligence tests can be improved in a similar fashion.

Colleges probably can improve the predictive value of high-school marks by making a careful study of the records of students so as to determine the actual value of the marks from each school for predicting college scholarship. If the marks from any school are too high, the college can find out that fact and can also ascertain how much they should be adjusted.

Hawks [2] investigated the value of high-school marks for predicting first-term freshman scholarship at Gettysburg College, Johns Hopkins University, and Vanderbilt University. She found that a plan of adjusting marks which she worked out empirically for one class at Johns Hopkins did have value in raising the correlations for two other entering classes at Johns Hopkins and for an entering class at

[1] See, for example, Symonds, *Measurement in Secondary Education*, chap. 3; and other similar discussions. See also Ashbaugh, "Reducing the Variability of Teachers' Marks"; in *Journal of Educational Research*, vol. 9, pp. 185–98.

[2] Lena J. Hawks, *Certain Relationships Between Scholarship in High School and in College*. Ph.D. dissertation, 1929, Johns Hopkins University.

each of the other institutions, the correlations for the two other entering classes at Johns Hopkins being raised from .64 to .77 and from .62 to .72. Had students been admitted upon the basis of "adjusted" high-school marks, no successful college student would have been refused admission, but 38 per cent, 18 per cent, and 30 per cent, respectively, of the first-term failures would have been excluded.

This is a promising line of attack. If followed up carefully, college admission or research bureaus may be able to select better college material for admission.

Further research along this line and other allied lines is needed to eliminate the waste of unsuccessful college students' time and of college resources. Not the least problem in such a program is the closer articulation of high school and college and the improvement of many aspects of the work of both. If only a small part of the criticism be true which is leveled against the secondary school by thoughtful members of college faculties and against the college by thoughtful school superintendents and men in secondary schools, then much room for improvement exists in both institutions.

7. *Predicting vocational success*

One of the most important problems of prediction concerns vocational success. Much has already been done toward finding accurate prognostic measures, yet we are only at the beginning of a movement which gives promise of yielding most valuable returns. We have space to indicate very briefly a few of the lines along which work has been done. For fuller discussion the reader is referred to various texts on Applied Psychology, Employment Psychology, and Vocational Guidance, as well as to the selected references given in section 3 of the bibliography at the end of this chapter. (See also page 281.)

Tests of mechanical aptitude. Tests have been devised to measure mechanical ability. We consider but two of these now. The Stenquist [1] tests consist of an assembly test and a paper-and-pencil test known as the *Stenquist Mechanical Aptitude Test.* The former embraces Series I and II, each consisting of ten common mechanical contrivances which have been taken apart and are to be assembled by the person being tested. Its author reports correlations of .42, .80, .81, .83, .88, and .90 between it and ranks given boys by shop teachers. It correlates low with intelligence, and high with achievement in trade courses. The paper-and-pencil tests, tests I and II, consist of pictures of tools and other mechanical instruments upon which many questions are asked. They are inexpensive group tests, and are easily given and scored, whereas the assembly tests are expensive and cumbersome. The paper-and-pencil tests are reported as correlating around .60 with both estimated ability in shop-work and intelligence-test scores, indicating that they have less value than the assembly tests.

MacQuarrie's paper-and-pencil test for mechanical ability seems to be superior to the Stenquist paper-and-pencil test, but not quite so good as the assembly test. MacQuarrie reports correlations from .48 to .80 between his test and teachers' estimates of mechanical ability.

Tests of clerical ability. Thurstone [2] has devised a test of clerical aptitude which correlated from .42 to .61 with a criterion of office efficiency. The work of Thorndike and Toops led to the publication of the *I.E.R.*[3] *General Clerical Test,* C–1, and the *I.E.R. Routine Clerical Test,* C–2, which have correlated .15, .38, .40, and .70 with various

[1] Stenquist, *Measurements of Mechanical Ability.*

[2] "A Standardized Test for Office Clerks"; in *Journal of Applied Psychology,* vol. 3, pp. 248–51.

[3] Toops, *Tests for Vocational Guidance of Children Thirteen to Sixteen.*

criteria of clerical ability. Ruggles,[1] O'Rourke,[2] and others also have devised tests to measure clerical aptitude. The six Ruggles tests correlate separately from .33 to .46 with ratings given clerks on aptitude and efficiency.

Tests of scientific aptitude. Zyve[3] at Stanford University has devised a battery of ten tests to measure scientific aptitude of college students. The tests are designed to measure (1) clarity of definition, (2) suspended vs. snap judgment, (3) experimental bent, (4) discrimination of values in selecting and arranging experimental data, (5) detection of fallacies and contradictions, (6) reasoning, (7) accuracy of systematic observations, (8) induction, deduction, and generalization, (9) accuracy of understanding and of interpretation, and (10) caution. Zyve reports its validity as .82, and its reliability as .93.

PROBLEMS FOR DISCUSSION

1. The value of prediction in educational and vocational guidance.
2. The use of intelligence tests in predicting scholastic success in high school and college.
3. The value of intelligence tests for prediction of vocational success.
4. Make a list of the more valuable tests for educational guidance; for vocational guidance.
5. What phases of adolescent behavior cannot be predicted now with a fair degree of accuracy?
6. The scholarship record of the last year in high school *vs.* the four-year record as a basis for predicting college success.

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[1] Ruggles, *A Diagnostic Test of Aptitude for Clerical Office Work.*

[2] Filer and O'Rourke, "Progress in Civil Service Tests"; in *Journal of Personnel Research,* vol. 1, pp. 484–520; "Partially Standardized Tests for Junior Clerks"; in *Public Personnel Studies,* vol. 3, no. 12, Series no. 27, pp. 346–71.

[3] "A Test of Scientific Aptitude;" in *Journal of Educational Psychology,* vol. 18, pp. 525–46.

7. Should college entrance be based upon fifteen high-school units or upon twelve senior high-school units? Why?
8. What is the best basis of prophesying scholarship in high school? In college?
9. The value of aptitude and prognostic tests in the secondary schools and in industry.
10. What students are likely to leave school at the end of one or two years? What adaptations of high-school work should be made for them?
11. In what ways can we increase the accuracy of predicting success in typewriting?
12. How can teachers or parents know which students should enter the vocational or technical courses?
13. If the high school has the try-out or exploratory function, to what extent should educational guidance prevent students from attempting subjects in which they are interested, but in which they are likely to fail?
14. What may the secondary school do toward detecting potential delinquency, and toward setting up an appropriate program of preventive treatment?
15. Pupil failures: analysis of causes; preventive measures.
16. What would you do, if at the end of a senior class in composition a boy who had shown no skill in construction and no originality either in idea or in phrasing, told you that he intended to become a writer? Why?

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CHAPTER XVIII

THE GUIDANCE AND CONTROL OF ADOLESCENT BEHAVIOR

O! had it been a stranger, not my child,
To smooth his faults I should have been more mild.

SHAKESPEARE

1. *The nature of the problem*

Substitution and punishment. The control of adolescent behavior obviously resolves itself into two problems: (1) that of securing effective and desirable responses, and (2) that of preventing or eliminating ineffective or undesirable ones. As we have already seen in Chapter IX, the best way of securing a certain response is to arrange the conditions so that making that response is satisfying, and not making it (i.e., making some other response) is annoying. The most efficient method of preventing or eliminating undesirable behavior is to substitute desirable behavior in its place. Repetition of the desired response tends to make it habitual, at the same time that disuse may operate to weaken the tendency to make the undesirable one. Of course, disuse does not necessarily weaken the tendency to respond to some strong instinctive urge like that of sex. In such cases effective control is secured through the substitution of other engrossing activities and certain possible sublimations.

Control also may be secured, although less effectively than by substitution, by using some form of punishment to insure the inhibition of the undesirable behavior. Connecting dissatisfaction with the undesired response aids in preventing its repetition on other occasions. The individual knows from personal experience that annoyance accompanies

or follows the unsuitable response. Under the best circumstances he learns not to do that thing. One of the most serious limitations upon punishment as a means of control during the teens, however, is that the youth may be forced to do or not to do a certain thing without his own inner assent. That is, he may regard the punishment as extraneous —not as an intrinsic or logically necessary element of that particular behavior series, but rather as something attached to it by the caprice or temporarily superior controlling authority of those inflicting it. Punishment at school and in the home is necessary, and in emergencies may have to be used under conditions which are quite unsatisfactory, it being then the lesser of two evils; but the need for it among adolescents should not be very great. If guidance and control before the teens have been positive rather than negative, if from earliest childhood the boy or girl has been properly habituated, the need for severe punishment is greatly lessened. In any event, however, the punishment used should be appropriate and, as nearly as possible, a natural or rational consequence of the youth's unsuitable response.

In the control of adolescent behavior we cannot profitably rely on the doctrine of catharsis (see page 448), because repetition *per se* does not weaken the connection between situation and response, but, on the contrary and apart from dissatisfaction, it tends to increase the probability of the response. Accordingly, undesirable behavior is to be avoided, either by substituting desirable behavior in its stead, or by promptly inhibiting it on account of its annoying concomitants.

Adolescent control best secured through guidance. It follows then, from what we have just said, that the best means of controlling adolescent behavior is through wise guidance, because in this way the positive factor of substitution is employed and the youth is learning at first hand

to control and direct his own affairs. Guidance is a desirable means of control at all ages, but its use during adolescence is increasingly important. Of course, the actual amount of guidance and direction may decrease as the youth gets older and is competent to give greater self-direction to his affairs. Under the best circumstances guidance is a coöperative affair in which the youth and his teachers or parents work together in attaining socially and individually desirable ends. Finally, we should remember that control or guidance has as its object the training of the child to be self-directed and self-controlled, a worker for the social good, and that he will best acquire these traits through actual practice.

2. *Parental control of adolescents*

Undesirable parental control of adolescents. Parents fail in many ways in controlling their children. At one extreme is found a very prevalent shortcoming — the lack of any adequate control. Under such circumstances the youth has complete direction and freedom of choice in all that he does. He is left to his own devices, without parental advice, suggestion, or assistance. This condition is often found when both parents are employed away from home during most of the child's waking hours. In many cases, though, the parents are too occupied with social or other affairs to give any attention to controlling or directing the conduct of their children; as long as the paths of parent and child do not cross, the latter may do as he pleases. Similar unsatisfactory conditions exist when parents are too ignorant, lazy, indifferent, or "good natured" to give the child positive training in self-direction and self-control, or when, imbued with an extreme form of the *laissez-faire* doctrine, they believe that control and guidance must come entirely from the child himself. Then there are parents who interpret the

newer child psychology and the Freudian doctrines to mean that the child should never be punished lest it interfere with his developing leadership, or that he should never be thwarted or repressed lest his mental health be impaired. Accumulating evidence indicates such a serious breakdown of parental guidance and control as places youth under great and needless difficulties in attaining wholesome, effective manhood and womanhood. Control is needed. Guidance is needed. Through them the wisdom and experience of maturity may be made effectively available to the inexperienced and immature so as to avoid many needless pitfalls. Yet from all our previous discussions it must be obvious that we are not advocating guidance and control of the "personally-conducted-tour" variety.

At the other extreme is found the harsh, strict, unsympathetic control in which the parent rigidly and brutally enforces proscription and prescription of every detail of conduct, leaving his child no place for exercising self-control and self-direction. This we may call the "no-lickin'-no-larnin'" type of control, well formulated in *The Hoosier Schoolmaster*, and exemplified in many homes in the "good old days." Its inadequacy is well recognized. We cannot hope to train youth to responsibility and self-control by giving him no practice in either. Character traits have a developmental history; they do not come like Minerva, full-grown from the head of a God. The implications of the story of their development in the individual are clear and illuminating for child training. Both extremes are undesirable.

Another sort of unsuitable control is coddling by overfond parents. Seeking to anticipate the child's every wish, trying to smooth out his difficulties for him, magnifying all his troubles, giving him no chance to learn to get along effectively with his fellows, retaining an unduly large

place in his life to the exclusion of the normal activities and associations of childhood and adolescence, and doing other equally unwise things, the indulgent parent hampers his child and stunts his moral and social development or places him under serious handicaps in attaining wholesome, effective personality.

Equally pernicious, however, is parental control which is uneven and unsteady and marked by irrational shifts from extreme severity to extreme laxity, depending upon the temporary emotional tone of the parent. Parental ire or indisposition plays a large part in many of these cases. If the parent has been crossed by some one, if things have gone wrong, if he is angry, he may take his revenge or give vent to his wrath by arbitrary treatment of his children. Probably no problem of control is more difficult for parents than that of keeping it steady, even, fair, and sympathetic. In countless instances parents oscillate from extreme indulgence to brutally enforced conformity, the criterion of control being the parents' humor or ill-humor, rather than any principles of right conduct. Parents' disagreeing or wrangling with each other over specific matters in the control of their children also is unsatisfactory.

Effective parental control. Wise and effective parental control not only employs both substitution and punishment, as indicated in the first section of this chapter, but also is characterized by evenness, firmness, fairness, sympathetic understanding, the absence of personal animosity or temper on the part of the parent, the presence and recognition of certain underlying principles of conduct to which the parent gives assent and seeks to have the child give rational assent, and adequate freedom for the child's initiative and self-direction. These principles of control have long been accepted by educators, but are frequently violated by parents.

The principle of freedom, for example, often causes much trouble, and great care is needed to secure the wise application of it. Youth needs all the freedom he can use wisely (or at least not harmfully), to the end that he may learn how to direct his own affairs. Here too, we find extreme views. Youth, we are told, is mad with freedom and wants to try every sort of experience, especially those proscribed by the moral code. While we prefer some other way of stating the adolescent's love of freedom, yet there can be no doubt about his desire for greater liberty of action and for greater self-direction.

To meet this alleged non-conformist tendency a diversity of remedies is proposed. At the one extreme we meet the glib recommendation that all restraints should be removed, since prescriptions and proscriptions are the cause of his shortcomings, his breaking the moral code and his disrespect for authority — a most curious recommendation since it is analogous to abolishing the rules of an athletic game in order to prevent the players breaking them. At the other extreme we find a stern insistence that the youth be given less freedom than during childhood, and that he be forced to give strict and unquestioned obedience to directions covering every detail of his life — as if he could thus *learn* to be self-directed in the affairs of life. We must remember that the boy or girl on the threshold of adolescence has a faulty and inadequate understanding of many important features of life, and that he is acquiring this understanding at the very same time that he is forming significant personal habits. He needs experience in self-control and self-direction, but he also needs wise guidance so that he will come to *recognize*, *accept*, and *use* (through habits, attitudes, and ideals) the best rules of playing the game of life. Only in this way can parental or other control meet the needs of the adolescent.

Sympathetic understanding is essential to wise parental control of children of all ages. At adolescence mutual understanding and respect between parent and child are particularly important. Such understanding comes largely through associating with the child, observing his activities, and participating in some of them. Nor can parents afford to forget their own adolescence; it will give some clues to sympathetic understanding of their adolescent children. Many parents find their lives so crowded with other more or less exacting demands that they have little time to know and understand their children in that wholesome intimate manner best suited to giving them the best guidance and control. Failing to be in touch with the pulsing eager life of youth, parents many times leave them to their own devices, or nag them incessantly, or use other equally ineffective and unsuitable means of control.

Adjusting guidance and control to individual needs. Two essentials in adapting guidance and control to the needs of each adolescent are ascertaining exactly what those needs are, and then devising procedures to meet them. At any particular time three things may advantageously be done: (1) The parent may prepare an extensive list of specific goals or objectives to be attained. (2) He may then appraise his child's attainments of each of them to see if suitable progress is being made, and to discover any weak points. (3) He may analyze these deficiencies to find out what sort of training is likely to be effective. We have reason for believing that positive active diagnosis and remedial treatment of deficiencies in the all-inclusive fields of personality and character development will yield the same valuable returns which they have shown in the more limited fields of instruction in the specific school subjects. Waiting until the child shows some very pronounced aberration in behavior is much less effective than the positive anticipation and avoidance of it.

Only by constant checking on the development of specific traits can guidance and control be suited to individual needs.

3. *Guidance and control of the adolescent in school*

The secondary school concerns itself almost exclusively with the education of adolescents, and is the school attended by the majority of the adolescents who go to school. Principles and practices in the guidance and control of this group depend upon both the aims of secondary education and the nature of the adolescent. A useful formulation [1] sets up seven objectives of education: (1) health; (2) command of fundamental processes; (3) worthy home membership; (4) vocation; (5) citizenship; (6) worthy use of leisure; and (7) ethical character. The high school plays an important rôle in achieving them. While the elementary school does much toward attaining the second one — command of fundamental processes — yet pupils entering junior high school are far from having adequate proficiency even along this line. Accordingly, all phases of secondary education are means for guiding and directing adolescent development along these seven lines.

These aims and the nature of the adolescent are important criteria for evaluating, reorganizing, and otherwise modifying high-school courses of study (including extra-curricular activities), methods of teaching,[2] discipline, classification, promotion, and educational and vocational guidance. Manifestly, a discussion of all these topics and their diverse implications for secondary education has no place in this volume, being treated at length in books on the principles of secondary education, methods of teaching in high school, the

[1] See *Cardinal Principles of Secondary Education,* by the Commission on Reorganization of Secondary Education.

[2] The content and internal organization of subject matter is an added criterion of method.

organization and administration of secondary schools, school and classroom management, principles of curriculum-making, and other similar volumes. Accordingly, we confine our discussion to a few of the important bearings of adolescent psychology on discipline, classification and promotion of high-school pupils, and methods of teaching. Space permits us to go no further than this except merely to note that the changes in children around the twelfth to fourteenth years indicate the desirability of beginning the period of secondary education earlier than the ninth grade.

Suggestions from adolescent psychology for high-school discipline. In addition to the usual principles and procedures characteristic of good school discipline, some of which have been noted under parental control, high-school discipline, to be most effective, should recognize and utilize the adolescent's greater independence and stronger desire to do things on his own responsibility, his greater responsiveness to the approval and disapproval of his fellows, his stronger sense of justice and fairness, his greater appreciation of square dealing, and his strong sex impulses and heterosexual interests. Deceit and unjust treatment by teachers are more strongly resented than ever before. His critical attitude and lack of experience make him less tolerant of things which have no appeal for him. He is likely to resent control which gives no place for his increased consciousness of self, and which does not treat him more as a grown-up. He may be impulsive, over-sensitive to criticism, somewhat given to moods, and is likely to find nagging extremely irksome. He also is likely to regard matters in a more personal manner, considering them with direct personal reference. His sense of loyalty to his group is stronger than during childhood, and will doubtless be still stronger at eighteen than at fourteen. He usually is more responsive to appeals for group purposes and is more willing to respond wholeheartedly to the sugges-

tions of those whom he respects and admires and who, in his estimation, understand him. These traits are evidence that the youth is on the road to maturity; the use of them in controlling him will facilitate his progress.

The classification and promotion of pupils. Since the range of individual differences in mental ability of school children probably is as great during adolescence as during childhood, some plan of classification is desirable to secure groups homogeneous in respect to significant abilities and achievement. Curricular and instructional demands can then be more readily suited to individual needs.

It has been argued that homogeneous grouping is undemocratic, tending to set up an intellectual aristocracy; it is also alleged that the slow pupils learn much from the brighter ones. Neither of these arguments is sound. The experience of many schools is that the slower pupils are happier [1] and prefer to be in the slower group — that is, with pupils who can do about the same quality of work. Of course, it is true that in many cases homogeneous grouping has been accompanied by much unwise publicity, and teachers have been careless or inconsiderate of pupils' feelings by referring to them as dull pupils, or as having low I.Q.'s, etc. Even the widespread plan of designating sections of a class by 1, 2, 3, etc., to indicate the brightest, next brightest, etc., need not be used if it causes the duller pupils any chagrin. The test of homogeneous grouping is not its use under either the worst or ideal circumstances, but rather how it works under attainable, practical school conditions.

Practical experience shows that the plan does not tend to set up an intellectual aristocracy, but that, on the contrary, it is highly democratic, enabling the school to adapt more

[1] See pages 528–29 for bearings of mental hygiene of adolescence on this problem.

readily its curricular and instructional demands to the needs of each pupil. Setting up standards which many pupils, even with great effort, cannot attain, has no more justification than setting up standards which can be reached by many other pupils with very little effort. Putting very bright and very slow pupils in the same class is discouraging to the slow pupils, and tends either to give the brighter ones a too-exalted opinion of themselves or to lead them to form habits of loafing; often both evils follow, as the following case shows:

R. D., a very bright little fellow in a very large city school system was in a seventh-grade class consisting of boys who had a wide range of ages, sizes, and abilities. He led his class with little effort. Sometimes his teachers, having him stand up beside some big fourteen-year-old lad who had failed miserably in reciting the lesson, had contrasted their size, asking the big boy if he wasn't ashamed of himself to let such a little fellow do so much better school work. The little fellow was transferred to a group of bright seventh-grade boys. When the history lesson was assigned and the study period began on his first day in that group, the little fellow looked at the book a minute, leaned back in the seat, and in a very caustic, critical manner sneered, "Kid stuff." The teacher looked him steadily in the eye a moment, and then told him that in this room the boys did as they were requested. He looked down at his book. In a few minutes the class began to recite. It was a revelation to him to see what these other boys knew. His whole attitude soon changed as he reappraised himself through contact with his intellectual peers.

The second argument against homogeneous grouping is equally fallacious, and rests upon a wrong notion of the distribution of ability. Dividing a class into two or more sections according to ability or achievement decreases the range of individual differences of each section but does not eliminate them, since ability or achievement is distributed according to Fig. 83, instead of according to Fig. 84. When grouped homogeneously, the pupils of each section

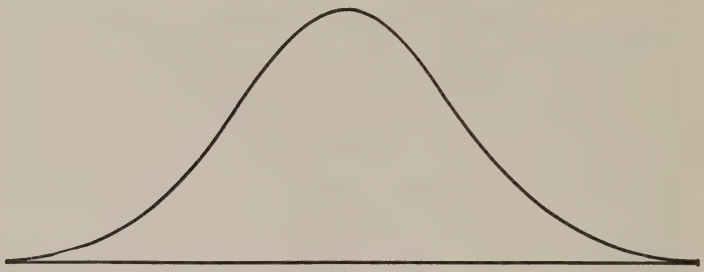

FIG. 83. A COMMON FORM OF DISTRIBUTION OF ABILITY IN HIGH SCHOOL

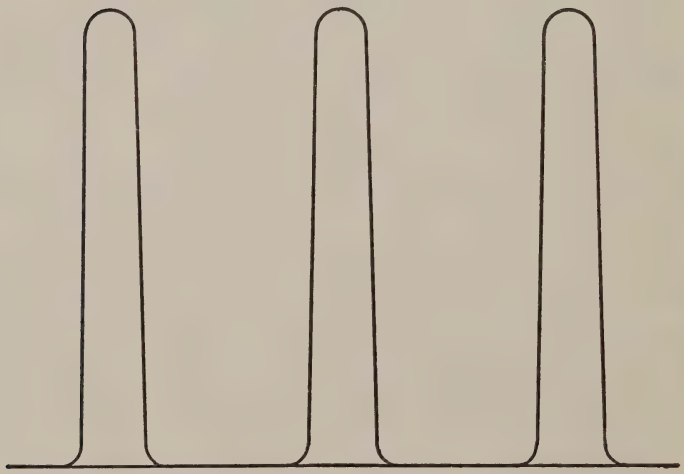

FIG. 84. A HYPOTHETICAL FORM OF DISTRIBUTION OF ABILITY IN HIGH SCHOOL

are more alike, but they are not entirely alike. Furthermore, we have the testimony of hundreds of experienced teachers to the effect that the slower pupils get very little benefit from having the very bright ones in the same class, and that for the most part they are discouraged rather than encouraged and aided thereby; that often the slower

ones are pushed too hard and the brighter ones allowed to loaf, as we have already noted.

Homogeneous grouping for academic achievement. We have already shown in Chapter XVII that the best basis for dividing a class into sections homogeneous in respect to scholarship is some combination of marks in the elementary school (especially in the last two or three years of it) and the scores on a good intelligence test. See also Chapter VI for a discussion of the relation between physical and mental development.

Homogeneous grouping for physical-education activities. Whenever the attempt is made to have the program of competitive athletics reach all pupils, instead of the few superior athletes, a difficult problem arises in finding a suitable basis for dividing the contestants into groups of approximately equal athletic ability, and at the same time in not exerting an undesirable influence upon the health of growing boys and girls. Methods commonly used are division into weight classes; some combination of age, weight, height, or grade in school; or the elimination of "letter-men" from interclass contests. Securing a fair, accurate basis for such grouping is of much importance. A great deal of investigation is yet needed, but Rogers' [1] work is a good beginning. His results indicate that each of seven physical-capacity tests is a better index of athletic fitness of high-school boys than either age, height, or weight, and that, combined, they are still quite superior to a combination of age, height, and weight. Rogers quotes [2] from Dr. Stolz, formerly state supervisor of physical education in California, on the use of weight classes as follows:

> Our own experience in California has taught us beyond question that classification by weight alone does not meet the criteria for fair

[1] *Physical Capacity Tests in the Administration of Physical Education.*
[2] *Op. cit.*, p. 11.

competition; first, because of the wide variation in maturity at a given weight; and, second, because the temporary modification of weight by training down is sure to be resorted to. . . . We cannot very well advocate for the growing boy or girl any system of classification which puts a premium upon holding the weight static or even reducing it below normal.

Further development of the physical-education work in schools will undoubtedly put even greater stress upon meeting individual needs of pupils. Too frequently the strong, robust athlete is given the same physical-education work as the weak, puny boy of the same school grade, although, with proper facilities, the director of physical education would provide some further differentiation to meet the differences in physical development and fitness.

Adolescent psychology and methods of teaching. In order that subject matter and the processes of mastering it may be of most value to high-school pupils, the methods of teaching must be in accordance with certain characteristics of adolescent boys and girls. Among the most important of these are the following: a more pronounced critical sense than during childhood, greater reasoning and greater general intellectual ability, a specialization of interests, a more mature outlook upon life, greater interest in a life career, and greater independence in likes and dislikes. Methods of teaching should provide that organization and presentation of materials which will challenge each youth's best effort, and stimulate his development along lines of special interest; that will throw him more and more upon his own resources, in finding material on problems of subject matter of every sort, in appraising it critically, in coming to his own conclusions, and in defending them. Each pupil should have instruction suited to his own needs, but, at the same time, he must be held responsible for helping himself more than ever before. Individualizing instruc-

tion is as important as in the elementary school. Analysis of errors and remedial procedures to overcome them are valuable. Even more valuable, however, is the training which the high-school pupil may thus derive in learning to analyze his own problems, and to discover and correct his own errors; for thus is he schooled in independent self-direction and guidance.

Individualizing school administration. Recent years have been marked by many notable changes in the flexibility and effectiveness of administrative machinery which make possible better adaptations to the needs of individual pupils. Extra promotions, different rates of advancement, homogeneous grouping, special classes, special coaching teachers, promotion by subject, summer school for pupils to make up one or two subject-failures or (if very able) to do the next half-year's work, classes for pupils of high-school age who have not completed the elementary-school course or have left school, night high school with courses of instruction on a par with those of day school and leading to the high-school diploma, individual assignments, and numerous other procedures have been devised to fit the school to individual needs — to make the child rather than the system the center of gravity in school administration. The lock-step of a generation ago has largely been displaced by measures and treatment suited to each child. The following cases are illustrative of the new attitude toward pupil needs.

Miriam C. had completed grade VA, and was recommended by her teacher as competent to do the essentials of grade VIB in a two months' summer school. She was thirteen years, eight months old, and had a mental age of almost fifteen years. She was well developed physically and had reached puberty the previous year. Inquiry revealed that she had entered school at the age of seven, had been very regular in attendance upon school, but had come to the United States less than four years previously. During this time she had gone through five grades of school and had acquired

a very good knowledge of English; but her educational achievement really excelled her classification in school. On the Trabue Language Completion test she was at tenth-grade norm; on the Woody Arithmetic Scale A — division — she solved correctly all thirty-six of the problems, being above the eighth-grade norm; on the Thorndike Alpha 2 Reading Scale, she was at eighth-grade standard. Accordingly, she was placed in grade VIIB. At the close of the two months' summer term she was promoted to VIIA; again at the close of the first term of the regular school year she was advanced to VIIIB, all her marks being very good.

A. R. In another case summer school, special coaching, and extra promotions enabled A. R., a Russian girl of eleven (Stanford-Binet mental age, fourteen years), to do the work of four school years in fifteen months, and enter junior high school before she was thirteen. Had she been required to spend a year in each grade she would have had no opportunity to go to high school, and for the simple reason that she would have been sixteen years of age by the time she could have entered the seventh grade.

Cases like the above are so common now that they are taken for granted. In times past, however, high schools have often been almost as inconsistent in their dealings with pupils as the college which allowed a student entrance credit in Caesar and Cicero, but would allow none in first-year Latin until the high school from which he graduated added it to his list of credits, having previously omitted it by mistake.

Many attempts have been made to adapt the high school to the needs of teen-age pupils. Early experiments along this line include the one by F. E. Spaulding in 1910, while superintendent of the Newton, Massachusetts, schools. Fifty girls were "transferred" from the grammar school to technical high school, where special adaptations of materials and methods were successfully made to suit their needs. The success of this experiment and of others which, at the time, were equally heterodox, gave a great impetus to the movement for adapting the high school to the needs of those of high-school age, "regardless of the completion of grammar-school course."

4. *Guidance and control of the adolescent gainfully employed*

Approximately as many adolescents are gainfully employed as are enrolled in all secondary schools — public, private, and parochial. Certain features of their recreational needs, vocational guidance, and further education have been neglected. Their recreational needs have been less effectively cared for than the needs of the adolescent in school, largely upon the more or less unconscious assumption that, since they are not in school, therefore, they are not entitled to these facilities; that, if they want them, they should go to school where they are offered. This is merely saying that communities usually regard these facilities as part of the school. Vocation bureaus are furnishing some guidance to those who have left school and are gainfully employed. Further extension of this service seems desirable, especially for those who leave school in the early teens.

Many States recognize the fact that adolescents going to work at the age of fourteen or fifteen need further training, and require them to attend continuation school a specified number of hours each week. We know that adolescent wage earners can learn. Investigation of their intellectual status and of their capacity to learn[1] indicates that they can profit from further training. Although the adolescents in high school are distinctly superior in abstract or verbal intelligence (as measured by existing tests) to those who are gainfully employed, yet it is quite significant that the two groups overlap, and that some of those at work have more mental ability than the average high-school student. Accordingly, the need for educational and vocational guidance is vital, not only in finding suitable employment for the youth at a specified time, but also in assisting him to find that more permanent employment in which he can make the best use

[1] See, for example, Thorndike *et al.*, *Adult Learning*.

of his capacities for growth and development. In so far as possible the employment should be of interest to the youth, aside from the lure of the weekly pay envelope.

The adolescent gainfully employed needs opportunities for self-improvement such as are offered in continuation schools, night high schools, night courses for technical workers, etc. He also needs wholesome recreational facilities, including the social activities which his adolescent nature craves, as well as suitable athletic games and sports to which reference has already been made.

5. *Guidance and control of social relations*

Recreations and social relations. We have already emphasized the need of a program of wholesome, engrossing recreational and athletic activities for all adolescents. We need only add that the parties, dances, games, and other similar affairs in which adolescents participate require enough supervision to insure their wholesomeness. Parents, even more than the school, have the important duty of guarding the physical and moral welfare of their adolescent boys and girls in respect to late hours, unchaperoned social functions, and the character and influence of associates.

Child marriages. [1] In Chapter I we have presented figures from the 1920 Census showing the extent of child marriages in the United States, and indicating that in the majority of cases these married children are native whites of native parents. We need not present the sordid details of case studies showing the evils and social waste that come from so many of the marriages of girls eleven, twelve, thirteen, and fourteen years of age. They are mere children, and have neither the physical nor the mental maturity requisite for the establishment and direction of happy, suc-

[1] For further data on this topic consult Parsons, *Social Freedom*; Richmond and Hall, *Child Marriages*; and other similar volumes.

cessful homes. Their immaturity and the folly of putting such responsibilities upon their young shoulders are suggested by the case of a fifteen-year-old girl-wife who was jumping rope on the sidewalk, and was "urged by her husband's people, with whom she lived, to do her jumping in the back yard only, as such conduct was unbecoming in a wife." The halo of romance with which boy and girl marriages have often been popularly surrounded disappears almost completely when the outcomes of such unions are closely analyzed.

We are interested now in problems of guidance and control, for which several measures seem necessary. They fall into three groups — educative, legislative, and administrative.

(1) *Educational measures effective in controlling child marriages.* Associations of parents, women's clubs, social and religious workers, and others interested in the welfare of children and of society may well ascertain the known facts about the extent of child marriages, the conditions in the community and State under which they are possible, and the remedies needed. If the present legislative safeguards are inadequate, the public must become aware of this fact; if the administration of existing safeguards is ineffective or corrupt, this fact should also be widely known. Further investigation of the problem also is needed to give a better factual basis for its solution. Much also can be done to provide suitable information for both parents and youth, and thus help decrease this unwise practice. A rural church in a certain mountain district in Tennessee fostered a "better-homes" educational program, with the result that in several years no girl under seventeen married, whereas previously the marriage of girls thirteen and fourteen years of age was quite common in this district.

(2) *Legislative aids to the effective control of child marriage.*

Legislative enactments are needed in many States to secure one or more of the following:

(*a*) A reasonable minimum age.

(*b*) Adequate proof of age, of parental consent, of legal residence, etc., before issuance of license. Social workers and educational authorities know well enough that the affidavit is very unsatisfactory evidence — parents, witnesses, and the contracting parties themselves often swearing falsely. Birth certificate, baptismal certificate, and, in the case of immigrants, passports are very good primary evidence.

(*c*) Advance notice of intention to marry to be given the license clerk some days — say, five — before the license can be issued. This is one of the most effective preventives of child marriages and, according to Richmond and Hall, is "in operation with certain exceptions allowed for, in eight States." Such a provision would speedily put the Gretna Greens out of business, and would seem not to be an unreasonable requirement of those about to establish a home.

(*d*) Salary for issuers of licenses, instead of fees. Under the fee system the more licenses issued, the greater is the income of the official issuing them; this tends to break down the honest administration of the laws.

(3) *Administrative measures.* Honest, and careful administration of the marriage laws is the third essential element in any program of adequate control. An investigation by Richmond and Hall,[1] covering 240 child marriages in 31 States, shows that the licenses were illegally issued in 129 of them. Organizations interested in the general social welfare may well find out how their local license bureau is working. Such information is necessary to know: (1) if the bureau is honestly and efficiently administered, and (2) what legislative enactments are needed to make its work more effective.

[1] *Op. cit.*

6. *Prevention or cure of delinquency*

Control of adolescent behavior in respect to delinquency presents the two obvious problems of preventing youth from becoming delinquent, and of reforming those who do. We need to know, therefore, what precautions are effective preventives, and what procedures are valuable for reformation. The experience of juvenile courts and other social agencies indicates that the chances of reforming juvenile offenders by the usual correctional methods are not very great, since as many as three-fifths of them may continue delinquent. Those who hold that adult criminals are recruited largely from the ranks of youthful offenders have much evidence in support of their contention, since so many of the latter have adult criminal records.

Cure of delinquency. Since the causes of delinquency are so numerous and combine in so many different groupings, adequate reform measures cannot be limited merely to a few set forms of treatment, but must include a great variety of possible ones to suit individual needs. Hope of success in reforming youthful offenders seems to lie in the following procedures and conditions:

(1) Early detection and treatment, since the youth is so frequently already well habituated in delinquency when he appears in juvenile court at the age of thirteen, fourteen, fifteen, or sixteen.

(2) Prompt hearings after arrest, since delay often means unwise detention.

(3) Careful study of all the internal and external conditions necessary to an understanding of each individual.

(4) Much personal work suited to the needs of each offender.

Since bad companions and bad homes cause so much delinquency, parole of those committed to institutions should be carefully administered so that the former bad surround-

ings are avoided. Otherwise, erring youth are soon likely to be back in court again; but when placed in good foster homes many of these are reclaimed. The cure of delinquent behavior consists partly in the avoidance of the causative environmental factors, rather than in their repetition and continuance. The parole system has been unwisely handled through congestion of cases, unconcern, ignorance, and insufficient provision for the needed intimate study of each youth. Individuals who probably will remain delinquent or become criminal under ordinary living conditions should be permanently segregated. Knowledge adequate for reasonably accurate prediction in such cases can be obtained if suitable facilities are available for studying each individual.

Much further research is needed to give conclusive evaluations to many possible reformatory procedures; yet juvenile courts, institutions for delinquents, and other agencies dealing with these young adolescents are not utilizing all the knowledge now available. They are prevented from using it either by the lack of adequate facilities or by failure to see its true significance.

Prevention of delinquent behavior among adolescents. Preventing delinquency among adolescents involves wise effective treatment before adolescence, because its incidence is so often found at an early age. Although the peak of juvenile-court appearance may come at fifteen or sixteen, many are already habituated in crime by this time. Effective preventive measures, whether for preadolescents or for adolescents, take account of the causal factors. Bad companionship, poor recreational facilities, bad home conditions, excessive street life, and low moral tone of a community need to be replaced by the corresponding, desirable conditions. Such a program requires vastly increased provision for parks, playgrounds, athletic fields, gymnasiums, and other recreational facilities, all competently directed and

controlled and readily accessible to those who need them. Children and youth need a fair and decent chance for such a large amount of vigorous, healthful, well-directed, interesting group activities as will occupy their spare time, and give them that recreation and activity which their growing minds and bodies demand. In many a community, even with the increased park and playground facilities, many youths cannot readily participate in the wholesome activities their natures crave without violating city ordinances and coming into conflict with organized society. Our cities and towns are not yet effectively planned and organized as suitable dwelling places for many, many boys and girls. An eminent authority on city planning may not have been far wrong when he said that "metropolitan growth is more and more of worse and worse."

Prevention may and often does necessitate removal of the youth from vicious homes.

Prevention is also concerned with those cases due to mental causes. Here the program should, and often does, include the following measures: The segregation of the feeble-minded, but with parole from institutions very carefully safeguarded to insure the necessary adequate supervision of all paroled cases; the sterilization of those positively known to have a certain specified degree of mental deficiency; the early detection and treatment of cases of mental conflict; the discovery of those showing evidence of instabilities, and a careful arrangement of surroundings to suit their needs, including institutional care in some cases.

School dissatisfaction is very often the result of outside influences. To the extent that it is due to the school's own shortcomings we may expect improvement through the differentiation of courses of study and methods of instruction to suit varying abilities and interests, and through suitable recreational activities.

7. *Guidance and control of other groups*

The feeble-minded. Effective guidance and control are needed also by the tens of thousands of feeble-minded youth who can do certain kinds of work reasonably well but need careful supervision of many phases of behavior in the modern complex world. The prevention of reproduction by those positively known to possess a certain degree of mental deficiency has been mentioned in the preceding section. Several States now have legal provision for sterilization of certain institutional cases, but for the United States as a whole the preventive provisions are quite inadequate. Having feeble minds means also having little foresight of the consequences of one's acts. Possessing the reproductive capacity of the normal youth, the feeble-minded adolescent of sixteen or eighteen may have the mental ability of a six- or eight-year-old child. Accordingly, special care, training, and supervision, and, in certain cases, sterilization are needed, both for the welfare of the feeble-minded and for that of society.

Other handicapped or defective adolescents. The blind, the deaf, the dumb, and those suffering from pronounced mental disorders present important and difficult problems of guidance and control. Preventive measures give promise of having great value in many of these cases.

The adolescent unemployed and not in school. There are tens of thousands of adolescents who are enrolled neither in school nor in the ranks of wage-earners. How many of them there are we do not know, but from the statistical data of Chapter I, in which we tried to account for all adolescents in the United States, we estimate that nearly three quarters of a million of youth, ages thirteen to nineteen, belong to the group unaccounted for. They are not in school, are not gainfully employed, and are not in institutions for mental defectives, the insane, or the delinquent. Doubtless some

of them are employed spasmodically; others, not at all. Many of them will not work; others cannot hold a job. This group has received little attention from society thus far. They are often without or beyond parental control, are largely beyond compulsory school age, and are forming habits of idleness, viciousness, or delinquency. They are a serious problem of contemporary American life. Many of them become delinquent; others will swell the ranks of the vagabond and the ne'er-do-well. A city magistrate [1] says of them:

> We have in New York at present, and have had for some years past, an immense army of young men, boys between fifteen and twenty-six, who are absolutely determined that under no conditions will they work. They sponge on women, swindle, pick pockets, commit burglary, act as highwaymen, and, if cornered, kill in order to get money dishonestly.

Whatever measures society may find effective in providing suitable guidance and control for this group, we can expect the following to be included: (1) Analysis and classification of youth into groups having divergent traits, characteristics, and needs; (2) work at reasonably congenial tasks with opportunities for advancement as improved efficiency is shown; (3) if necessary, compulsory employment at suitable tasks; (4) stimulating contacts with opportunities for self-improvement; and (5) wholesome recreational and physical (or athletic) activities of interest to those participating in them. Throughout this entire program there should be constant stimulation to self-respect, self-confidence, and individual initiative to the end that the youth may become the responsible and competent director of his own affairs for his own welfare and that of society. Better compulsory-attendance laws in many States, better enforcement in all of them, and

[1] Chief City Magistrate William McAdoo, in the *New York World*, December 18, 1920.

further adaptations of the school's offerings to meet the needs and interests of these teen-age boys and girls would undoubtedly be of distinct advantage among the younger ones who are leaving school to join this large group. Finally, the home can do much toward the solution of this important problem. Child training and control from early infancy through adolescence can be made much more effective, if parents unselfishly, conscientiously, and persistently set themselves to the task and utilize to the best of their abilities the resources at their command.

PROBLEMS FOR DISCUSSION

1. What justification for the junior high school does adolescent psychology give?
2. Punishments for adolescents.
3. The feeble-minded delinquent.
4. Coöperation of school and home in carrying on a social-guidance program.
5. What is the value of moral development as a basis of homogeneous grouping in the secondary school? To what extent is such grouping now used?
6. Adapting curriculum and instruction to individual needs of pupils in non-homogeneous groups.
7. Sex differences in school discipline of adolescents.
8. Adapting the secondary school to individual needs in case of (1) the large urban school, (2) the school of 400 to 800 students, (3) the school of 50 to 75 students.
9. In what way may educational and vocational guidance best be made to function in the junior high school? What practical work in vocational guidance can the small high school give?
10. Does acceleration (rapid advancement) cause social misfits?
11. Educational and recreational provisions for adolescents who do not attend school.
12. What differences in methods of teaching are needed for bright and dull pupils?
13. The educational and moral guidance of the adolescent who has to leave school at an early age to work, who has good tendencies, but undesirable associates.

14. The relative advantages of rapid advancement and enriched curriculum as a means of meeting the individual needs of adolescents.
15. Dangers to be avoided in organizing and administering student government.
16. What can (1) home, (2) school, (3) church, (4) press, (5) amusements, and (6) other community agencies do to aid in preventing or correcting juvenile delinquencies such as theft and robbery, assault, destruction of property, and sexual immorality?
17. Show how problems of discipline arise from the fact that pupils frequently prefer the approval of their classmates to the approval of the teacher.
18. Suggest and evaluate some solutions of the problem of the adolescent who is not in school, and is not at work, and cares for neither school nor work.

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GLOSSARY

ability grouping. *See* **homogeneous grouping.**

acceleration, change in rate (or velocity). Acceleration is negative when the rate is decreasing, positive when the rate is increasing, and zero when the rate remains constant.

adolescence, the period of life from the close of childhood until manhood or womanhood during which the sex functions mature.

aëration (ā-ēr-ā′shŭn), act or process of supplying air.

allantois (ă-lăn′tō-ĭs), an organ developed by the embryos of reptiles, birds, and mammals, and forming the most important part of the umbilical cord.

altitude of intellect, the part or aspect of intellect measured by the level or difficulty of mental tasks.

amnesia (ăm-nē′sĭ-ă; -zĭ-ă), defect or loss of memory, especially marked by inability to remember particular words.

amnion (ăm′nĭ-ŏn), a thin membrane forming a closed sac surrounding the embryos of reptiles, birds, and mammals.

anthropometric (ăn′thrō-pō-mĕt′rĭk), pertaining to measuring the human body and its parts.

Army Alpha, a group intelligence test devised for use with literates in the United States Army during the war.

arteriosclerosis (är-tē′rĭ-ō-sklē-rō′sĭs), abnormal thickening and hardening of the arteries.

autistic thinking (ô-tĭs′tĭk), thinking which gratifies some desire and does not square itself with the real world; e.g. day dreaming.

autonomic (ô′tō-nŏm′ĭk), the nervous system controlling the internal changes which take place during the emotions; see page 208.

axillary, of or pertaining to the arm-pit.

axon (ăk′sŏn), a process of a neuron which conducts impulses away from the cell body.

catatonic(kăt′ă-tŏn′ĭk), a type of dementia præcox; see page 484.

catharsis(kă-thär′sĭs), literally, purgation. In psychology, applied to the doctrine that early wrong-doing *per se* immunizes against later wrong-doing.

centimeter (sĕn′tĭ-mē′tĕr), a measure of length, equal to one hundredth of a meter, or .3937 of an inch.

chorion (kō′rĭ-ŏn), a membrane (always embryonic, never maternal, in origin) enveloping the fetus of mammals, external to and inclosing the amnion.

cm., abbreviation for centimeter.

conative (kŏn′ă-tĭv), of or pertaining to the power or act which directs or impels to effort of any kind; pertaining to will power.

cretin (krē′tĭn), one having a form of idiocy marked by physical degeneracy and deformity (usually with goiter).

deciliter (dĕs′ĭ-lē′tẽr), a measure of volume, equal to one tenth of a liter, or 6.1 cu. in., or 3.38 fluid ounces.

dementia præcox (dē-mĕn′shĭ-ȧ prē′kŏks), early or precocious dementia or insanity; see pages 482–86.

dendrite (dĕn′drīt), a process of a neuron which conducts impulses toward the cell body.

endocrine glands, the ductless glands or the glands of internal secretion, such as the thyroid and adrenal glands.

epiphysis (ĕp-ĭf′ĭ-sĭs; pl. -ses (sēz)), a part or process of a bone which ossifies separately and subsequently becomes united to the main part of the bone.

extrovert, literally to turn inside out; hence, an individual who finds the "unconditioned value" outside of himself; see page 468.

ganglion (pl. ganglia), a nerve center, a collection of nerve cells.

glycogen (glī′kŏ-jĕn), a carbohydrate from the liver.

gram, unit of weight in the metric system, equivalent to 15.432+ grains.

hebephrenic (hē′bē-frĕn′ĭk), a type of dementia præcox; see page 484.

heterosexual (hĕt′ẽr-ō-sĕk′shŭ-ăl), of or pertaining to the opposite sex.

homogeneous grouping (hō′mō-jē′nē-ŭs), often the same as ability grouping; putting in the same class or group those pupils who are closely alike in scholarship, mental ability, or other respect.

hormone (hôr′mōn), a specific chemical substance formed in one gland or organ and carried by the blood or lymph to another organ which it excites to functional activity.

Hydra (hī′drȧ), any of a genus of small, typically fresh-water polyps, as the sea anemone, the coral, etc.

hypochondriacal (hĭp′ō-kŏn-drī′ȧ-kăl; hī′pō-), affected by a mental disorder characterized by morbid anxiety as to the patient's health, often with simulation of diseases.

hysteria (hĭs-tē′rĭ-ȧ), a mental disorder marked by a form of delirium, stupor, or dream states involving partial or complete amnesia.

idiot, a feeble-minded person whose I.Q. is less than 25.

inhibition, restraint imposed upon one psychical state by another; the stopping or checking of an already present action.

initiatory rites. *See* **pubic rites.**

integration (ĭn′tē-grā′shŭn), formation of a whole from constituent parts; a combination of different elements into a single complex object.

intelligence quotient, mental age divided by chronological age, the result being expressed as a per cent.

introvert, literally to turn (the mind) inward upon itself; hence one given to introversion; see page 468.

I.Q., abbreviation for intelligence quotient.

k, symbol for coefficient of alienation; formula, $k_{12} = \sqrt{1 - r_{12}^2}$; see pages 147–51.

Kg., abbreviation for kilogram.

kilogram, a measure of weight, equal to 1000 grams, or 2.2046 pounds.

kinæsthetic (kĭn′ĕs-thĕt′ĭk), pertaining to the sense of muscular effort.

laissez faire (lĕ′sā′fâr′), literally let (people) do or make (what they choose); hence non-interference.

limen (lī′mĕn). *See* **threshold.**

M.A., abbreviation for mental age; see page 97.

manic, of, pertaining to, or characterized by, mania.

maturation (măt′ū-rā′shŭn), process of bringing or coming to full development or maturity, especially sexual maturing.

median, the fifty-percentile; the mid-point or mid-score; the point in a series so chosen that one half of the individuals in the series are on one side of it, and one half of them on the other.

millimeter (mĭl′ĭ-mē′tĕr), one thousandth of a meter, equal to .03937 of an inch.

mm., abbreviation for millimeter.

morphogenesis (môr′fō-jĕn′ē-sĭs), the production of structural characters in plants and animals; the evolution and development of form.

morula (mŏr′ōō-lå), *Embryology*, the globular mass of cells (blastomeres) formed by cleavage of the egg of many animals in its early development.

multiple correlation, the correlation between one trait or variable and an additive combination of two or more other traits or variables.

neurasthenia (nū′răs-thē′nĭ-å), literally nerve weakness or debility; a nervous disorder characterized by abnormal fatiguability; see page 486.

neuron (nū′rōn), a nerve-cell with its processes and terminations (axon, cell body, and dendrites) regarded as a functional and structural unit of the nervous system.

neurosis (nû-rō′sĭs), a functional disorder of the nervous system, not dependent upon any discoverable lesion (i.e., upon loss of or injury to nerve tissue).

ontogeny (ŏn-tŏj′ē-nĭ), the evolution or developmental history of the individual organism.

overlearning, learning beyond the threshold; e.g., learning a series of words until able to repeat them correctly two or more times.

paranoia (păr′å-noi′å), a slowly progressive mental disease marked by systematized delusions built up in a logical form; see page 481.

partial correlation, the correlation between two traits or variables independent of the influence of one or more other traits or variables.

P.E., abbreviation for probable error. (*q.v.*)

phobia (fō′bĭ-å), a suffix denoting fear, and often implying dislike or aversion.

phylogeny (fī-lŏj′ē-nĭ), the evolution or ancestral history of a race or group of animals.

probable error (abbreviation P.E.), a measure of reliability; the true correlation, for example, is regarded as lying within the limits of the obtained correlation plus or minus 4 times its P.E.; and similarly for the mean, median, etc.

$$\text{P.E.}\ (r) = .6745\,\frac{1 - r^2}{\sqrt{N}}.$$

prophylaxis (prō′fĭ-lăk′sĭs), art of guarding against or preventing disease; preventive treatment.

protozoön (prō-tō-zō′ŏn), a protozoan; an animal of the primary or lowest division of the animal kingdom in which the body (usually) consists of only a single cell, and reproduction is by fission.

psychasthenia (sī′kăs-thē′nĭ-ă), literally psychic or mental weakness, debility, or fatigue; see page 486.

psychogenic disorders (sī′-kō-jĕn′ĭk), functional mental disorders; disorders due to psychological causes; see pages 479–89.

psychosis (sī-kō′sĭs), a disease or disorder of the mind; especially one unattended with structural changes in the brain.

psychotic (sī-kŏt′ĭk), pertaining to or caused by psychosis.

puberty (pū′bĕr-tĭ), the earliest age at which an individual is capable of bearing or begetting offspring.

pubescence (pū-bĕs′ĕns), quality or state of being pubescent or of reaching puberty.

pubic rites, among primitive peoples the initiatory or other rites which boys (and sometimes girls) underwent about the time of puberty when they were taught certain tribal customs preparatory to their becoming full-fledged tribesmen.

r, abbreviation for coefficient of correlation.

radiograph, a picture or photograph made by Röntgen rays; an X-ray picture; a skiagraph.

regression coefficient, a fraction showing the ratio of one variable to another with which it is correlated.

regression equation, an equation by which one variable may be estimated from knowledge of another variable with which it is correlated; see pages 448–50.

reliability, a basic criterion of mental tests, indicating consistency of performance.

saltation, a leaping or jumping.

schizophrenia (skĭz′ō-frē′nē-ă), a mental disorder characterized by cleavage of the mental functions; also called dementia præcox; see pages 482–86.

S.D., abbreviation for standard deviation.

sigma, same as standard deviation; so-called from the Greek letter σ (sigma), which is its symbol.

spirometer (spī-rŏm′ĕ-tĕr), an instrument used to measure tne amount of air exhaled.

standard deviation (abbreviation S.D.), a measure of the variability or dispersion of a series; the square root of the average of the squares of the deviations of a series of measures from their arithmetic average, or other measure of central tendency.

synapse (sĭn′ăps), the place where the nerve impulse is transmitted from the axon of one neuron to the dendrites of another neuron.

teleological (tĕl′ĕ-ō-lŏj′ĭ-kăl; tē′lĕ-), of the nature of, or relating to, design or purpose.

threshold, bare perceptibility or discrimination.

trophoblast (trŏf′ō-blăst), a special layer of ectodermic tissue developed on the outer surface of the blastodermic vesicle of many mammals.

vasomotor (văs′ō-mō′tĕr), designating those nerves which serve to contract or relax the muscle fibers in the walls of the blood vessels.

vis a tergo (vĭs′ä tĕr′gō), a force from behind.

visceral (vĭs′ĕr-ăl), of or pertaining to the internal organs, especially of the trunk, as the heart, liver, etc.

vital capacity, breathing capacity; usually measured by the maximum exhalation following a maximum inspiration.

vital-height ratio, or **index,** the ratio of vital (breathing) capacity to height; i.e., vital capacity ÷ height.

vital-weight ratio, or **index,** the ratio of vital (breathing) capacity to weight; i.e., vital capacity ÷ weight.

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